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Canby Creek Watershed Project

Lincoln and Yellow Medicine Counties, Minnesota

FINAL ENVIRONMENTAL IMPACT STATEMENT

Harry M. Major, State Conservationist

Soil Conservation Service

Sponsoring Local Organizations

Yellow Medicine Soil and Water Conservation District

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P.O. Box 545  
Clarkfield, Minnesota 56223

Lincoln Soil and Water Conservation District

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August 1974

PREPARED BY

UNITED STATES DEPARTMENT OF AGRICULTURE  
Soil Conservation Service  
316 North Robert Street  
St. Paul, Minnesota 55101

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## FINAL ENVIRONMENTAL IMPACT STATEMENT

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USDA ENVIRONMENTAL IMPACT STATEMENT

Canby Creek Watershed Project

Lincoln and Yellow Medicine Counties

Minnesota

Prepared in Accordance with  
Sec. 102(2)(c) of Public Law 91-190

SUMMARY SHEET

- I. Final
- II. Soil Conservation Service
- III. Administrative
- IV. The proposed project measures consist of conservation land treatment, two single-purpose floodwater-retarding reservoirs, one multipurpose reservoir, and approximately 0.8 mile of stream channel stabilization.
- V. Summary of environmental impacts and adverse environmental effects.
  - A. Reduce erosion on 7,500 acres of cropland and pastureland.
  - B. Reduce floodwater damages to 145 businesses and residences in Canby.
  - C. Reduce flooding on 5,200 acres of flood plain land.
  - D. Reduce floodwater damages to 15 roads and bridges.
  - E. Reduce sediment deposition in Lac qui Parle Reservoir.
  - F. Reduce other agricultural floodwater damages.
  - G. Provide opportunity for 47,800 recreation visits annually.
  - H. Provide a warm water fishery.
  - I. Improve upland game and waterfowl habitat.
  - J. Reduce floodwater damages to crops and pasture.
  - K. Increase duration of flooding on downstream low-lying areas.
  - L. Reduce natural habitat on approximately 4½ miles of channel.
  - M. Eliminate 690 acres from agricultural production.
  - N. Increase noise, solid waste, and air pollution.
  - O. Permanently inundate 1½ miles of trout stream.
- VI. Alternatives considered:

- A. Land treatment.
- B. Combination flood plain zoning and flood insurance.
- C. Single-purpose flood prevention structures and land treatment.
- D. Delay or termination of proposed project.

VII. The following commented on the draft environmental statement:

Department of the Army; Department of the Interior;  
Department of Transportation; Environmental Protection  
Agency; Upper Mississippi River Basin Commission;  
Governor of Minnesota; Minnesota State Planning Agency  
(State Clearing House); Minnesota Department of  
Natural Resources; and Minnesota Association of Soil  
and Water Conservation Districts.

VIII. The draft statement was transmitted to CEQ on January 8, 1974.

USDA SOIL CONSERVATION SERVICE ENVIRONMENTAL STATEMENT<sup>1/</sup>

Title of Statement: The Canby Creek Watershed Project  
Lincoln and Yellow Medicine Counties, Minnesota

Type of Statement: Final

Date: August 1974

Type of Action: Administrative

Statement:

1. DESCRIPTION

Authority for Project:

Federal assistance through Public Law 566, 83d Congress, 68 Stat. 666, as amended.

Sponsoring Local Organizations:

Lincoln Soil and Water Conservation District and Yellow Medicine Soil and Water Conservation District.

Purpose of Project:

Watershed protection, flood prevention, and recreation.

Project Measures:

The project plan provides for conservation land treatment measures, two single-purpose floodwater retarding reservoirs, one multipurpose structure for storage of floodwater and water for recreation, and approximately 0.8 mile of stream channel stabilization.

Project Objectives and Purposes:

The project Sponsors and the Soil Conservation Service have three main purposes to achieve in the development of the plan. They are: Watershed Protection, Flood Prevention, and Recreation. The objectives necessary to fulfill the purposes are described as follows:

---

<sup>1/</sup> All information and data, except as otherwise noted by references to sources, were collected during watershed planning investigations by the Soil Conservation Service, U.S. Department of Agriculture.



### Watershed Protection (Conservation Land Treatment)

The objective is to accelerate the application of conservation practices<sup>2/</sup> and improve the management of the various land uses in the watershed. The goal is to have 75 percent of the land adequately treated<sup>3/</sup> at the end of the seven-year project installation period. The soils, especially in the upland moraine area, require conservation practices and improved management to maintain their productivity.

### Flood Prevention

The flood prevention goal is to achieve a level of flood prevention that is compatible with land use in the flood hazard area.

The objective is to obtain protection from a 100-year frequency flood event in the city of Canby and protection from a five-year frequency flood event on the agricultural flood plain within the watershed.

### Recreation

The recreational objective is to provide a water-based recreation development that partially satisfies the needs in the surrounding area. A development that provides for swimming, picnicking, boating, fishing, camping, and hiking is needed in the area. A facility with a peak capacity not to exceed 1,000 people was decided as being the most practical.

### Environmental Setting:

#### Physical Data

Canby Creek Watershed is located in west Central Minnesota, in the Minnesota River Subbasin portion of the Mississippi River Basin. It includes an area of 20,150 acres of approximately 32 square miles. There are 1,820 acres of the watershed in Lincoln County, and 18,330 acres in Yellow Medicine County. About one-half the land area within the city of Canby (pop. 2,147<sup>4/</sup>) is located in the downstream portion of the watershed. Marshall, the nearest major trading center, is located about 30 miles southeast of the watershed. Minneapolis and St. Paul are located approximately 160 miles to the east.

---

<sup>2/</sup> Conservation practices are those farming operations that protect the land from excessive soil loss from wind or water erosion.

<sup>3/</sup> Land adequately treated is land used within its capability on which the needed conservation practices that are essential to its protection and planned improvement have been applied.

<sup>4/</sup> 1970 Population Census Data, U.S. Department of Commerce.



Major soil and water resource problems in the watershed include erosion over the entire watershed area, flooding within the city of Canby and flood plain agricultural lands, and sediment transport through the lower reaches. There is a shortage of water-based recreation in the vicinity of Canby.

Canby Creek Watershed is approximately 2.5 miles wide and 12 miles long. The maximum elevation in the watershed is 1,785 feet and the minimum is 1,188 feet above mean sea level. The grade of Canby Creek varies from 15 to 68 feet per mile.

The upper third of the watershed is gently rolling to undulating plateau containing several small marsh areas. Fine-textured prairie soils derived from glacial till occur in this area.

The lower two-thirds of the watershed contains rolling, steep hilly land with short slopes and numerous knolls. Canby Creek is well entrenched and has a steeper gradient through this reach. Some springs and seeps occur at the upper end of the reach. Well-drained loam and clay loam soils predominate, but small sandy and gravelly areas are common.

A small portion of the watershed near Canby consists of a sloping glacial lake plain. Canby Creek has cut a narrow, moderately entrenched, flood plain through the glacial lake plain deposits. Silty, moderately well to imperfectly drained soils are dominant. Fine, as well as sandy textured soils, and soils underlain by gravel, occur in the area.

The area immediately below the outlet of the watershed is a glacial lake plain sloping to the north. The area is drained by the continuation of Canby Creek. This channel was reconstructed in 1955, and is known as county ditch No. 8.

A larger area of glacial lake plain is located about 9 miles downstream of the Canby Creek Watershed. Both Canby Creek and Lazarus Creek (next stream to the north) drain through this area. The channel through the glacial lake plain is a natural winding drainageway of limited capacity.

Monthly normal temperature ranges from 13° F. in January to 74° F. in July. The extreme temperatures recorded in the city of Canby during 40 years of record are 111° F. to minus 33° F. The average date of the last frost is May 10, and that of the first frost is October 2, an average frost-free period of 145 days.<sup>5/</sup>

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<sup>5/</sup> Climatological Data, U.S. Department of Commerce.

The mean annual precipitation is 24 inches, with approximately 75 percent occurring during the growing season. The probability of high intensity rainfall is greatest from May through August. Snow-melt runoff is often intensified by spring rains. The mean annual snowfall is 41 inches.<sup>6/</sup>

The minimum annual precipitation recorded at the National Weather Service Substation at Canby was 14.2 inches in 1931. The maximum recorded was 35.0 inches in 1953.<sup>6/</sup> Twenty-four hour precipitation amounts of 3.4, 4.6, and 5.7 inches occur on the average of once every 5, 25, and 100 years respectively.<sup>7/</sup>

Sioux Falls, South Dakota, and Fargo, North Dakota, are the nearest National Weather Service stations that record wind data. The fastest wind speed recorded at Sioux Falls was 70 miles per hour in June 1952. The fastest recorded at Fargo was 115 miles per hour in June 1959. The prevailing wind direction, of winds that cause soil erosion, is from the northwest.<sup>6/</sup>

Known mineral resources in the watershed consist of sand and gravel deposits. A commercial sand and gravel processing plant is located in Canby. Sand and gravel mineral reserves for this portion of Yellow Medicine County are contained in a belt of glacial deposits approximately one-half mile wide and 16 miles long covering approximately 5,000 acres. The sand and gravel deposits along Canby Creek in the vicinity of Canby are a part of these reserves.

Studies indicate that the reserves of sand and gravel are estimated to be 6 times the projected demands through the year 2020 for the Minnesota River Basin and that every county in the basin is believed to contain ample reserves.<sup>8/</sup>

Ground water resources consist of sand and gravel aquifers within the glacial till. These deposits yield potable water that is adequate in quantity and quality for existing and foreseeable needs.

The land use in the watershed and flood plain is summarized in the following tables:

---

<sup>6/</sup> Climatological Data, U.S. Department of Commerce

<sup>7/</sup> Technical Paper No. 40, U.S. Department of Commerce.

<sup>8/</sup> Upper Mississippi River Comprehensive Basin Study, prepared under supervision of U.M.R.C.B.S. Coordinating Committee.



Table I - Land Use in the Canby Creek Watershed

<u>Land Use</u>	<u>Acres</u>	<u>Percent</u>
Cropland - - - - -	12,400 - - - - -	61.5
Pastureland - - - - -	5,050 - - - - -	25.1
Forest Land - - - - -	110 - - - - -	0.5
Urban and Built Up <sup>1/</sup> - - - - -	330 - - - - -	1.6
Other Land <sup>2/</sup> - - - - -	2,260 - - - - -	11.3
<hr/>		
Total - - - - -	20,150 - - - - -	100.0

<sup>1/</sup> The urban area includes only the portion of the city within the watershed boundary.

<sup>2/</sup> Other land uses include farmsteads, channel areas, roads, Lake Sylvan, wetlands, and other areas managed for wildlife.

Table II - Land Use of Flood Plain Within Watershed

<u>Land Use</u>	<u>Acres</u>	<u>Percent</u>
Cropland - - - - -	290 - - - - -	61.7
Pastureland - - - - -	80 - - - - -	17.0
Urban and Built Up - - - - -	70 - - - - -	14.9
Other Land <sup>1/</sup> - - - - -	30 - - - - -	6.4
<hr/>		
Total - - - - -	470 - - - - -	100.0

<sup>1/</sup> Includes rural roads and Lake Sylvan.

Table III - Land Use of Flood Plain Downstream of Watershed<sup>1/</sup>

<u>Land Use</u>	<u>Acres</u>	<u>Percent</u>
Cropland - - - - -	3,640 - - - - -	77.0
Pastureland - - - - -	870 - - - - -	18.4
Urban and Built Up - - - - -	100 - - - - -	2.1
Other Land <sup>2/</sup> - - - - -	120 - - - - -	2.5
<hr/>		
Total - - - - -	4,730 - - - - -	100.0

<sup>1/</sup> Flood plain located between the outlet of Canby Creek Watershed and the confluence of Lazarus Creek with Lac qui Parle River.

<sup>2/</sup> Other land uses include farmsteads, roads, and areas managed for wildlife.

The watershed presently has two separate outlets during periods of normal flow. The major tributary, Canby Creek, has a drainage area of 26.8 square miles. The other tributary, county ditch No. 19, has a drainage area of 4.7 square miles.

Canby Creek originates in the southwest corner of Yellow Medicine County. The upper 3 miles of channel have limited capacity, intermittent flow,<sup>9/</sup> and is unmodified. From this point downstream to the city of Canby there is a well-defined, unmodified channel with perennial flow.<sup>10/</sup> Several springs and side tributaries outlet into Canby Creek. Most of the tributaries are well-defined, unmodified channels with ephemeral flow.<sup>11/</sup> Approximately 2 miles of county ditch have been constructed on one tributary in the southwestern portion of the watershed. Flow is ephemeral.

Canby Creek enters Lake Sylvan (nearly filled with sediment deposition), a 7-acre lake within the city limits of Canby. The perennial stream continues below the lake through the city and flows in a northeasterly direction until it enters county ditch No. 8 at the outlet of the watershed. From U.S. Highway No. 75 downstream to the first north-south township road there are approximately 2,100 feet of man-made channel. The remainder of Canby Creek in this reach is in a natural condition.

The channel stability of county ditch No. 8 is dependent on a supply of natural gravels from the eroding stream reach upstream of the St. Leo Road. The eroding stream reach is presently providing the necessary gravels to protect and stabilize county ditch No. 8.

County ditch No. 19 has about 2½ miles of modified channel from the outlet upstream through the city of Canby. The remaining stream is in an unmodified condition. Tile outlets contribute to a perennial flow.

County ditches Nos. 8 and 19 outlet into Lazarus Creek. From these points the creek flows north and then east into the Lac qui Parle River. The Lac qui Parle River flows into the Minnesota River, at the south end of the Lac qui Parle Reservoir, approximately 10 miles northwest of Montevideo, Minnesota.

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<sup>9/</sup> Intermittent flow - continuous flow through some seasons of the year but little or no flow through other seasons.

<sup>10/</sup> Perennial flow - flows at all times except during extreme drought.

<sup>11/</sup> Ephemeral flow - flows only during periods of surface runoff, otherwise dry.

The surface water in Canby Creek near Canby is of the calcium-magnesium, sulfate, and bicarbonate type.<sup>12/</sup> Samples collected at a period of median flow on Canby Creek approximately 1 mile upstream from Canby had the following analysis:

Table IV - Chemical Analysis, Canby Creek<sup>1/</sup>

<u>Compounds</u>	<u>Parts per Million</u>	<u>Equivalents per Million</u>
Iron and Manganese - - - - -	0.32 - - - - -	- - - - -
Dissolved solids - - - - -	1,040 - - - - -	- - - - -
Sodium and Potassium - - - - -	- - - - -	3
Magnesium - - - - -	- - - - -	12
Calcium - - - - -	- - - - -	19
Chloride, Fluoride, and Nitrate - - - - -	- - - - -	1
Sulphate - - - - -	- - - - -	23
Carbonate and Bicarbonate - - - - -	- - - - -	8

<sup>1/</sup> Water Resources of the Lac qui Parle River Watershed, Hydrologic Investigation Atlas HA-269, Geological Survey, U.S. Department of Interior, 1968.

The Minnesota Pollution Control Agency includes in its definition of Canby Creek "waters which are or may be used for fishing, fish culture, bathing or any other recreational purposes, and for which quality control is or may be necessary to protect aquatic or terrestrial life, or the public health, safety, or welfare".<sup>13/</sup>

On May 22, 1968, two temperature measurements were made on Canby Creek. In sec. 9, T. 114 N., R. 45 W., the temperature of the water in the channel was 56° F. In sec. 22, T. 114 N., R. 46 W., the temperature was recorded as 54° F.

The rate of base flow of Canby Creek approximately one mile upstream from Canby on August 4 and 5, 1965, was 0.7 cubic foot per second. The average rate of surface flow is estimated at 6 cubic feet per second.<sup>12/</sup>

There are 619 acres of types II through VI wetlands within and adjacent to the watershed. Wetlands are identified in Table V. These areas are also presented on a Wetlands Inventory Map as Appendix D.

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<sup>12/</sup> Water Resources of the Lac qui Parle River Watershed. Hydrologic Investigation Atlas HA-269, Geological Survey, U.S. Department of Interior, 1968.

<sup>13/</sup> Water Quality Management Plan --- Interim --- Minnesota River Basin. Minnesota Pollution Control Agency, July 1971.



Table V - Wetlands in the Canby Creek Watershed

<u>Section</u>	<u>Tps.</u>	<u>Range</u>	<u>Wetland Type<sup>1/</sup></u>	<u>Surface Area of Each (Acres)</u>
3 & 34	- 113 & 114	- - 46	- - - V	- - - 2/131
4	- - - 113	- - - 46	- - - II	- - - 10, 11
4	- - - 113	- - - 46	- - - III	- - - 5
5	- - - 113	- - - 46	- - - III	- - - 0.5, 1, 6
5	- - - 113	- - - 46	- - - IV	- - - 8
5	- - - 113	- - - 46	- - - V	- - - 8, 2
6	- - - 113	- - - 46	- - - II	- - - 2, 2.5
6	- - - 113	- - - 46	- - - III	- - - 1, 1
5 & 6	- - - 113	- - - 46	- - - IV	- - - 10
11	- - - 114	- - - 46	- - - III	- - - 9
12	- - - 114	- - - 46	- - - IV	- - - 25
14	- - - 114	- - - 46	- - - III	- - - 1.5
15 & 16	- - - 114	- - - 46	- - - IV	- - - 12
16	- - - 114	- - - 46	- - - III	- - - 3/31
20	- - - 114	- - - 46	- - - III	- - - 2.5
21	- - - 114	- - - 46	- - - III	- - - 2, 5, 3
21	- - - 114	- - - 46	- - - IV	- - - 2, 8
21	- - - 114	- - - 46	- - - VI	- - - 2
22	- - - 114	- - - 46	- - - II	- - - 1.5
22	- - - 114	- - - 46	- - - III	- - - 1.5
23	- - - 114	- - - 46	- - - III	- - - 2
23	- - - 114	- - - 46	- - - V	- - - 1
25	- - - 114	- - - 46	- - - II	- - - 1
25	- - - 114	- - - 46	- - - IV	- - - 2
26	- - - 114	- - - 46	- - - II	- - - 7.5
26	- - - 114	- - - 46	- - - III	- - - 3
26	- - - 114	- - - 46	- - - IV	- - - 4
26	- - - 114	- - - 46	- - - VI	- - - 2, 18
27	- - - 114	- - - 46	- - - II	- - - 3
27	- - - 114	- - - 46	- - - III	- - - 1
28	- - - 114	- - - 46	- - - II	- - - 2
28	- - - 114	- - - 46	- - - III	- - - 2, 3
28 & 33	- - - 114	- - - 46	- - - II	- - - 4
28 & 33	- - - 114	- - - 46	- - - III	- - - 15
29	- - - 114	- - - 46	- - - III	- - - 5

See footnotes at end of table, p. 9.



Table V - Wetlands in the Canby Creek Watershed--Contd.

<u>Section</u>	<u>Tps.</u>	<u>Range</u>	<u>Wetland Type</u> <sup>1/</sup>	<u>Surface Area of Each (Acres)</u>
29 & 32	- - 114 - - - -	46 - - - -	III - - - -	8
30 & 31	- - 114 - - - -	46 - - - -	III - - - -	5
31 - - - -	114 - - - -	46 - - - -	II - - - -	1
31 - - - -	114 - - - -	46 - - - -	III - - - -	1
31 - - - -	114 - - - -	46 - - - -	V - - - -	3
31 & 32	- - 114 - - - -	46 - - - -	IV - - - -	11
32 - - - -	114 - - - -	46 - - - -	II - - - -	25, 4
32 - - - -	114 - - - -	46 - - - -	III - - - -	1, 3
33 - - - -	114 - - - -	46 - - - -	II - - - -	1, 3
33 - - - -	114 - - - -	46 - - - -	III - - - -	2/25, 6
33 - - - -	114 - - - -	46 - - - -	V - - - -	2/133
34 - - - -	114 - - - -	46 - - - -	V - - - -	2
19 - - - -	114 - - - -	45 - - - -	III - - - -	2
29 - - - -	114 - - - -	45 - - - -	III - - - -	2.5, 2

<sup>1/</sup> Wetlands of the United States, Fish and Wildlife Circular 39, U.S. Department of Interior - pp. 21 and 22.

<sup>2/</sup> Bohemian Wildlife Management Area.

<sup>3/</sup> Penthole Wildlife Management Area (Outside Watershed).

Total Acres By Type

<u>II</u>	<u>III</u>	<u>IV</u>	<u>V</u>	<u>VI</u>	<u>Total</u>
78.5	156.6	82	280	22	619

Economic Data

There are approximately 95 farm operators which have all or part of their farms within the watershed. The major farm enterprises are beef, hogs, and cash grain crops. Slightly over half of the total value of farm products sold is in the form of livestock and livestock products. The average gross income per farm in Yellow Medicine County in 1964 for all farm products sold was \$13,219 while in 1959 the average income was \$9,250.<sup>14/</sup>

Approximately 62 percent of the watershed is in cropland producing mainly corn, soybeans, small grain, and hay. About 25 percent is in pastureland and the remaining 13 percent is forest land, farmsteads, roads, urban areas, and areas managed for wildlife. Average crop yields per acre on the flood plain are

<sup>14/</sup> Census of Agriculture, U.S. Department of Commerce.

as follows: corn - 65 bushels, soybeans - 22 bushels, oats - 60 bushels, and hay - 3.35 tons. The average farm is 220 acres in size and has an average value of \$175 to \$200 per acre. Land with a flooding problem has an average value of \$150 to \$200 per acre. All of the rural land is in private ownership except 379 acres of wildlife land owned by the State. In Yellow Medicine and Lincoln Counties about 30 percent of all farms are operated by tenants.

Approximately 110 acres are in forest cover which occurs along drainageways and on irregular slopes. Present forest type is northern hardwood consisting mainly of bur oak. There are limited markets for local forest products within the region. All forest land is privately owned. Current federal-state forestry programs available to forest landowners include Cooperative Forest Management, Cooperative Forestation, and Cooperative Insect and Disease Control.

The population within the watershed is approximately 1,400 people, of which approximately 1,075 are residents of the city of Canby. Businessmen, residents, and farm operators located within the flood plain frequently suffer damages from flooding which generally causes the greatest economic difficulty.

Sixty-three percent of the 2,751 registrants with the Minnesota Department of Employment Security earned less than \$3,000 a year according to their survey conducted in Yellow Medicine County during 1965 and 1966. This group, which included students and housewives, is about 12 percent of the population of Yellow Medicine County. About 30 percent of the registrants lived in the Canby area. Twenty percent listed agriculture as their occupational field.<sup>15/</sup>

The watershed is well served by federal, state, county, and township roads. The Chicago and Northwestern Railroad traverses through the lower part of the watershed in a northwest-southeasterly direction.

Canby is an active community serving a rural retail trade area of about 725 square miles. The annual retail sales in Canby in 1962 were estimated to be \$3.5 million. The 1962 real estate full assessed valuation was slightly over \$3.1 million. The per capita debt is below average.<sup>16/</sup> The population has been maintained during the last 40 years whereas many other towns in western Minnesota have decreased in population. A vocational-technical school was recently established to provide an educational opportunity for the youth in the area. The area for expansion within Canby is limited.

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<sup>15/</sup> Manpower Resources of Yellow Medicine County, Minnesota Department of Employment and Security, January, 1967.

<sup>16/</sup> The People and Progress of Canby, Minnesota, Community Fact Survey by Otter Tail Power Company in Cooperation with Canby Commercial Club, 1963.



City officials have expressed a desire for expansion toward the east in the area now subject to frequent flooding.

A flood hazard analysis report for the city of Canby was completed in 1973. The Soil Conservation Service performed the study in cooperation with the city of Canby and the Minnesota Department of Natural Resources.

The Canby City Council is in the process of enacting an ordinance to restrict future development within designated "floodway" limits. Floodway limits will be established by allowing encroachment on the existing flood plain only to the extent that the present condition 100-year frequency flood elevation will rise no more than 0.5 foot as required by state regulations.

When the watershed structural measures are installed, the ordinance will be revised to reflect the degree of protection afforded by the measures.

#### Fish and Wildlife Resources

The wildlife habitat distribution is such that it can be split into two different areas. The upper one-third of the watershed is composed predominantly of cropland and pastureland fairly uniformly distributed throughout. Woody cover is limited to approximately 7 acres per square mile. This cover is predominantly in the form of farmstead windbreaks and shelter belts. The majority of the existing wetlands present are found in this part of the watershed. (See Table V, pages 8 and 9, and Appendix D.) These wetlands provide habitat for marsh-related as well as terrestrial wildlife species.

The lower two-thirds of the watershed is primarily cropland with some pastureland and very few wetlands. There is a larger amount of woody cover present than in the upper one-third of the watershed. The majority of this woody cover is concentrated along Canby Creek averaging approximately 20 acres per mile of stream, in the 5 sections of land through which Canby Creek flows. Tree composition of the streamside habitat consists of primarily boxelder, cottonwood, elm, and some white oak. Understory plants include willows, dogwood, and perennial herbaceous plants. Uplands adjacent to Canby Creek have a woody cover distribution similar to that in the upper one-third of the watershed.

Permanent herbaceous nesting cover is limited primarily to roadside ditches, streambanks, and odd areas; however, ditches are often mowed for weed control or snow catch and thus are reduced in value for nesting.

Existing wildlife habitat resources are utilized by a variety of game and nongame species. Representative game species in the watershed include: white-tailed deer, ring-necked pheasant, Hungarian partridge, fox squirrel, cottontail rabbit, mallard, blue-winged teal, green-winged teal, redhead, raccoon, red fox, mink, and muskrat. The green-winged teal is present in the watershed for only a few months during spring and fall migration. The redhead breeds here but is harvested at a much lower rate than the green-winged teal.

Representative nongame species include: ground squirrel, hawk, owl, heron, and mourning doves, as well as various species of songbirds. Many species of hawks migrate through the area, but only three, the red-tailed, marsh, and sparrow hawks, breed here. The great horned owl is the primary owl species present although other owl species breed in the area, including burrowing owl. The only heron present in any numbers is the American bittern; the others are present only during migration and never in great numbers. Both Richardsons and thirteen-lined ground squirrel are present.

The watershed lies in the migratory range of several species listed in the "Threatened Wildlife of the United States", 1973 Edition, published by the U.S. Fish and Wildlife Service. These include: the Arctic peregrine falcon, American osprey, Eastern pigeon hawk, and whooping crane. The watershed is located on the extreme eastern edge of the native range of the Western burrowing owl.

Surveys have been made by the Minnesota Department of Natural Resources to obtain indexes of utilization and population levels of wildlife resources. Although wildlife population information is gathered on a county basis for Yellow Medicine County, it is typical of the watershed and gives a measure of relative abundance and importance of various species in the area.

The August pheasant counts for the period 1941-1963 in Yellow Medicine County average 461 and range from 131 in 1947 to 892 in 1955 (all figures in birds/100 miles).<sup>17/</sup>

Since 1963 the pheasant population has declined considerably; However, there are still huntable populations. There were no counts made in Yellow Medicine County in either 1970 or 1971. Census have been run both in 1972 and in 1973. The figures for the August census in these two years are 5 and 23 birds/100 miles respectively.

Deer harvest data indicates that approximately one deer is harvested for every three square miles in the county. The deer season in recent years has been closed in Yellow Medicine County during 1966, 1968, and 1971. The entire state was closed during 1971.

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<sup>17/</sup> Abstracted from Minnesota Department of Natural Resources' Game Research Project Quarterly Progress Reports.



Table VI lists the major species of ducks harvested in southwestern Minnesota and indicates the relative proportion of harvest for each species on opening weekend of the 1970 waterfowl hunting season.

Table VI - Hunter Bag Check in Minnesota Opening Weekend 1970

<u>Waterfowl</u>	<u>Region II<sup>1/</sup></u> (percent)	<u>State</u> (percent)
Mallard - - - - -	24 - - - - -	35
Green-winged teal - - - - -	25 - - - - -	16
Blue-winged teal - - - - -	20 - - - - -	16
Pintail - - - - -	11 - - - - -	5
Baldpate - - - - -	7 - - - - -	5
Wood Duck - - - - -	5 - - - - -	4
Shoveller - - - - -	3 - - - - -	3
Redhead - - - - -	2 - - - - -	2
Gadwall - - - - -	1 - - - - -	1
Ringneck Duck - - - - -	1 - - - - -	7
Ruddy Duck - - - - -	(2) - - - - -	(2)
Bufflehead - - - - -	(2) - - - - -	(2)
Canvasback - - - - -	(2) - - - - -	(2)
Scaup - - - - -	(2) - - - - -	4

<sup>1/</sup> Game Management Region II includes 25 counties in Southwestern Minnesota of which Yellow Medicine and Lincoln are a part.

<sup>2/</sup> Less than one percent.

Fishery resources in the watershed are limited to approximately 8 miles of stream upstream from Canby. The stream from sec. 21, T. 114 N., R. 46 W., down to sec. 9, T. 114 N., R. 45 W., is designated as a trout fishery by the Minnesota Department of Natural Resources, Commissioner's Order No. 1852. Yearling brown trout of nine-inch catchable size have been stocked since 1961, as indicated in Table VII.

Table VII - Canby Creek Stocking Records<sup>1/</sup>

<u>Year</u>	<u>Number</u>	<u>Year</u>	<u>Number</u>
1961 - - - - -	198	1969 - - - - -	204
1962 - - - - -	194	1970 - - - - -	200
1964 - - - - -	200	1971 - - - - -	648
1966 - - - - -	198	1972 - - - - -	639
1967 - - - - -	203	1973 - - - - -	752
1968 - - - - -	203		

<sup>1/</sup> Minnesota Department of Natural Resources.

Access to the fish and wildlife resources of the area is provided by a network of state, county, and township roads. Access to Canby Creek is provided adjacent to bridge crossings. Most land users grant access to individuals on private land to utilize the fish and wildlife resources if permission is asked. Public access is provided on the two state wildlife management areas listed below:

Table VIII - State Wildlife Management Areas

<u>Name</u>	<u>Acres</u>	<u>Location</u>
Minn-Kota - - - -	66 - - - - -	sec. 6, T.113N., R.46W.
Bohemian - - - -	313 - - - - -	sec. 33 & 34, T.114N., R.46W. sec. 3 & 4, T.113N., R.46W.

Recreational Resources

Canby has three parks, each consisting of about 4 square blocks in size. They contain playground equipment, picnic areas, limited camping areas, ball playing fields, and a municipal swimming pool. There is also a 75-acre, 9-hole public golf course. All existing facilities are open to public use and used primarily by local residents. No tabular data is available regarding the use of existing facilities.

Archeological and Historical Values and Unique Scenic Areas

In accordance with the National Historic Preservation Act of 1966 (Public Law 89-665), the National Register of Historic Places was consulted and no places were listed within the watershed.

The Minnesota Historical Society has located an archeological site consisting of earth lodges, sec. 34, T. 114 N., R. 46 W., in Yellow Medicine County, identified as site No. 21-Y.M.-27.

Soil, Water, and Plant Management Status

The Lincoln and Yellow Medicine Soil and Water Conservation Districts have followed an intensive program of planning and applying needed land treatment measures. At the time of work plan preparation, there were 55 cooperators with the districts covering about 54 percent of the area of the watershed. Of this number, 20 have developed conservation plans which cover about 20 percent of the watershed.

Approximately 4,170 acres of cropland, including the class I land and land with erosion and wetness hazards, and 990 acres of pastureland are adequately treated with soil and water



conservation practices.<sup>18/ 19/</sup> The practices applied on these lands include: conservation cropping systems, crop residue management, diversions, drainage field ditches, field windbreaks, minimum tillage, terraces, drains, and pasture and hayland management. Approximately 8,230 acres of cropland and 4,060 acres of pastureland are inadequately treated. The remaining land of 2,700 acres consists of forest land, farmsteads, channels, roads, areas managed for wildlife and urban areas. No significant land use changes are taking place in the watershed. Adequate forest fire protection is provided by local fire departments. No forest fires have been recorded during the past 5 years.

#### Water and Related Land Resource Problems:

There are approximately 9,350 acres of cropland with a water erosion hazard within the watershed. To date, approximately 1,250 acres are adequately treated. Most of the inadequately treated cropland involves soil capability classes II and III on the upland soils located in the central part of the watershed.<sup>19/</sup>

Row crop farming without adequate conservation practices account for the majority of soil erosion. Complexity of the slopes and intensive cropping patterns make the application of conservation practices difficult. Approximately 100 acres in the vicinity of Canby have a wind erosion hazard. Approximately 250 acres of cropland need on-farm drainage systems for more efficient agricultural production.

Approximately 4,060 acres of pasturelands are inadequately treated. Overgrazing, lack of livestock watering facilities, and low soil fertility have caused problems including sheet and streambank erosion. Forest cover has deteriorated as a result of woodland grazing and the absence of forest land management.

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<sup>18/</sup> Land adequately treated is land used within its capability on which the needed conservation practices that are essential to its protection and planned improvement have been applied.

<sup>19/</sup> Soil capability classification reflects the problems or hazards of the individual soils. Class I soil have few limitations that restrict their use. Soils in class II have some limitations that reduce the choice of plants or require moderate conservation practices. Soils in class III have severe limitations that reduce the choice of plants, or require special conservation practices, or both. Generalized Soil Map of Yellow Medicine County, by the Soil Conservation Service, U.S. Department of Agriculture, and Soil Survey, Lincoln County, Minnesota, by Soil Conservation Service, U.S. Department of Agriculture in cooperation with the Minnesota Agricultural Experiment Station, January 1970.

### Floodwater Damage

The major floodwater damages occur in the city of Canby and to crop and pasture lands on the flood plain downstream from State Highway No. 68. Floodwater damage also occurs to roads, bridges, and fences.

Floodwater damages occur in the city of Canby on the average of once every five years from excess rainfall runoff and once every seven years from snowmelt runoff. Although floods from snowmelt runoff are not as frequent as floods from excess rainfall, the snowmelt runoff usually causes more damage.

The basements, first floors, and lawns of 22 homes and three business places along Canby Creek are subject to damage from floodwaters. Property values of these places, as well as an additional 35 homes located adjacent to the flood plain, have been reduced. The basements and lawns of 58 homes and 2 business places located in the northwestern part of Canby are subject to flood damage from the overflow of county ditch No. 19. Property values of these places, as well as an additional 25 homes located adjacent to the flood-prone areas, have been reduced. The projected average annual damage in the city of Canby is \$31,810, including indirect urban damages of approximately \$4,150. Indirect damages consist of loss of business and the increased travel distance required when streets are flooded.

Damaging floods to crop and pasture occur more frequently during May, June, and July from excess rain at a time when crops are less able to survive flooded conditions. Floods during the snowmelt season occur frequently; however, damages are primarily limited to roads and bridges.

Approximately 470 acres are subject to flood damage from a 100-year frequency flood, of which 290 acres are in cropland, 80 acres in pastureland, 70 acres in urban and built-up areas, and 30 acres of other land. The two-year frequency flood inundates about 71 acres while the five-year frequency flood inundates about 167 acres.

An additional 4,730 acres located downstream from Canby Creek Watershed to the junction of the Lac qui Parle River are subject to flood damage. Of this amount, 3,640 acres are in cropland, 870 acres in pastureland, 100 acres of urban and built-up, and 120 acres in other land uses. The two-year frequency flood inundates about 2,480 acres while the five-year frequency flood inundates about 3,360 acres.

Approximately 50 farm families are affected by the flooding conditions of which 10 are located within the watershed and the remaining 40 are located downstream.



Average annual damages amounting to \$870, including indirect damages, are occurring to crops and pastures in the watershed. Approximately \$80,000 average annual damages including indirect damages occur to crops and pastures downstream. Indirect damages consist of interruption of the farming operation and increased travel to markets required when roads and bridges are damaged or destroyed. Other agricultural average damages such as fence damage, debris deposition, weed infestation, etc., including indirect damages, amount to \$230 in the watershed and \$14,770 downstream. Damages to roads and bridges at 10 locations are estimated at \$4,000 annually including indirect damages within the watershed. Downstream these annual damages amount to approximately \$3,500 at 5 locations.

A severe rainstorm occurred in the watershed on July 26, 1963. Although no attempt was made to determine the aerial extent of the storm, 5.2 inches of rain fell in three hours in Canby. This exceeds the 100-year frequency point rainfall for this area. According to the "Canby News", two people were injured (one hospitalized) and several families had to be evacuated from their homes with boats. Highway No. 68 was closed within the city limits where water inundated the highway. Highway No. 75 was inundated for three-fourths of a mile northeast of Canby.

A survey was taken by the city of Canby to determine the monetary losses caused by this flood. Following is a summary of the results of the survey for the Canby area:

City of Canby Municipal Property	- - - -	\$16,650.00
City of Canby Personal Property	- - - - -	18,369.10
City of Canby Business Property	- - - - -	12,013.70
Railroad Property	- - - - -	20,000.00
Farm Property	- - - - -	5,550.00
State Property	- - - - -	1,700.00
County Property	- - - - -	7,620.00
Total	- - - - -	<u>\$81,902.80</u>

Local residents felt that loss of life and much more serious damage were prevented because numerous volunteers assisted in evacuating people and moving property to higher elevations.

#### Soil Erosion and Sediment Damage

Upland sheet erosion is occurring on 8,100 acres of cropland southwest of Canby at an estimated rate of 13 tons per acre per year. Limited sheet erosion is occurring on the sloping pastureland southwest of Canby. Erosion on this pastureland is estimated at less than 4 tons per acre per year.



Streambank erosion is occurring intermittently on 14 miles of Canby Creek channels upstream from the city of Canby. This erosion is occurring at a rate of 100 tons per channel mile on an annual basis. The land voided by streambank erosion is approximately 0.01 acre per year per mile of channel.

There is streambank and channel bottom erosion occurring on about 500 feet of previously modified Canby Creek channel in Canby. The channel banks and bottom consist of a fine sand and gravel mixture. The present erosion is occurring in various areas along this reach, particularly on areas with a small amount of vegetation.

Gully erosion is occurring on steeper areas (9,600 acres) throughout the watershed. The land voided from gully erosion is estimated at 0.3 acre per year. The average amount of sediment from gully erosion on the 9,600 acres is estimated at 0.3 ton per acre per year.

The annual sediment yield at the mouth of the watershed, including the area from county ditch No. 19, is estimated to be 42,000 tons per year.

Sediment from upland sheet erosion is being transported through the natural stream system. This fine textured sediment is not causing significant damage to flood plains and channels but is being deposited in the Lac qui Parle Reservoir which is 35 miles below the outlet of the watershed. The Canby Creek Watershed is producing an estimated 28,000 tons of sediment in the Lac qui Parle Reservoir on an annual basis.

#### Drainage

Cropland soils in the watershed having a wetness problem have prevented about 250 acres from being farmed at the most economical level. The wet conditions have an adverse effect on the yields and production costs.

#### Recreation

The present population within Minnesota, in a 50-mile radius of the city of Canby is 99,400.<sup>20/</sup> The projected population for the year 1980 is 93,300.<sup>20/</sup> A demand exists for facilities to provide for an additional 100,000 recreational visits annually. The only lakes within the watershed boundaries offering a potential for water-based recreation are designated as wildlife management areas by the State of Minnesota. Within this 50-mile radius of Canby, however, major recreation lakes (Hendricks, Lac qui Parle, and Big Stone) are found, as well as several other smaller lakes. Local units of

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<sup>20/</sup> Minnesota Population Trends, Projections - Minnesota Department of Health, March 1972.

government have demonstrated an interest by offering to help finance water-based recreational resources. There is high local interest in developing public water-based recreation.

### Fish and Wildlife

A trend toward more intensive agricultural use of the land has contributed to declines in wildlife populations as shown in wildlife census data. The existing wetlands need to be retained and additional winter cover areas, food plots, and nesting and brood cover are needed.

### Economic and Social

Population has declined approximately 6.5 percent in Yellow Medicine County between 1960 and 1970, from 15,523 to 14,516. Population projection for 1980 is 13,595 and for 2000 is 12,175.<sup>21/</sup> This represents a decline of 6.3 percent for 1980 and 16.1 percent for 2000 from the 1970 population. Other studies indicates a decline of 12 percent for 1980 and 34 percent for 2000 from 1970 population.<sup>22/</sup> The projected trend in population would be representative of the rural population of the watershed. The population within the city of Canby is projected to increase by 50 percent by the year 2000.<sup>21/</sup>

Between 1964 and 1969, 17½ percent of the total farm operators in Yellow Medicine County sold farm products valued at less than \$5,000.<sup>23/</sup> Seven and one-half percent of the farm operators sold farm products valued at less than \$2,500.<sup>23/</sup> Additional opportunities are needed for these operators.

Eleven percent of the farms in Yellow Medicine County in 1964 used hired labor for 150 days or more. In 1969 the hired labor dropped to 6 percent.<sup>23/</sup> Most farms are family-sized operations.

Incomes of family farms affected by the flooding conditions need to be stabilized and improved. Additional off-farm employment opportunities are needed as well, in order to improve rural community development. Achieving these needs will encourage more people to remain in the area.

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<sup>21/</sup> Minnesota Population Trends, Projections - Minnesota Department of Health, March 1972.

<sup>22/</sup> Population Project 1975-2000. Minnesota Economic Data, Counties, and Regions. University of Minnesota, in cooperation with Minnesota State Planning Agency, April 1973.

<sup>23/</sup> 1969 Census of Agriculture, U.S. Department of Commerce, Part 15, Minnesota, Section 2, County Data, Table 13, Yellow Medicine County.



Planned Project:

Land Treatment Measures

The accelerated land treatment program planned to be installed during the project period includes: practices which will adequately treat an additional 5,000 acres of cropland, 2,500 acres of pastureland, 110 acres of forest land, and 50 acres of other land managed for wildlife.<sup>24/</sup>

Farmers and land users will be urged through local soil and water conservation districts to use good management in the use of fertilizers and pesticides along with appropriate conservation practices to minimize water quality degradation downstream.

Some of the conservation practices that are applicable to adequately treat the land include:

<u>Land Use</u>	<u>Conservation Practice</u>	<u>Description of Practice</u>
Cropland	Contour farming	Farming sloping cultivated land in such a way that plowing, preparing land, planting, and cultivating are done on the contour.
	Stripcropping	Growing crops in a systematic arrangement of strips or bands across the general slope to reduce water erosion.
	Terraces	An earth embankment or a ridge and channel constructed across the slope to reduce erosion from the rainfall runoff on the longer slopes.
	Diversion	A grassed channel with a supporting ridge on the lower side constructed across the slope.
	Field windbreaks	A strip or belt of trees or shrubs established within or adjacent to a field.

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<sup>24/</sup> Land adequately treated is land used within its capability on which the needed conservation practices that are essential to its protection and planned improvement have been applied.



(Continued)

<u>Land Use</u>	<u>Conservation Practice</u>	<u>Description of Practice</u>
	Minimum tillage	Limiting the number of field operations to those that are properly timed and essential to produce a crop and prevent soil damage.
	Grassed waterways	A natural or constructed waterway or outlet shaped or graded and established in suitable vegetation as needed for the safe disposal of runoff from a field.
	Grade stabilization structure	A structure to stabilize the grade or to control head cutting in natural or artificial channels.
	Drainage field ditch	An accepted agricultural practice that is a graded ditch for collecting excess water within a field.
	Drains	A conduit, such as tile, pipe, or tubing installed beneath the ground surface and which collects and/or conveys drainage water.
	Crop residue management	Managing plant residues on a year-round basis in which harvesting, tilling, planting, and cultivating operations are performed in such a way to keep protective amounts of vegetation on the soil surface.
Pastureland	Pasture and hayland management	Proper treatment and use of pastureland to maintain or improve the quality and quantity of forage, to protect the soil and reduce water loss.

(Continued)

<u>Land Use</u>	<u>Conservation Practice</u>	<u>Description of Practice</u>
Other land	Wildlife wetland habitat management	Retaining, creating, or managing wetland habitat for wildlife.

A combination of two or more conservation practices may be needed to achieve adequate land treatment.

Installation of practices such as stripcropping, grassed waterways, and pasture and hayland management will increase available cover for ground-nesting birds. Crop residues<sup>25/</sup> will contribute more food and cover for wildlife species. Installation of field windbreaks will provide additional habitat for songbirds, as well as travel lanes for various terrestrial wildlife species. Proper hayland management can result in the destruction of habitat for ground-nesting birds unless mowing is delayed until July 15.

The Sponsoring Local Organization estimates that 37 additional land users will become cooperators with the soil and water conservation districts and that 60 additional land users will develop soil and water conservation plans on their farms during the project period with accelerated technical assistance from the Soil Conservation Service. The Sponsoring Local Organization, with Soil Conservation Service assistance, will make the necessary contacts to plan and apply the needed land treatment measures. Soil surveys will be provided for approximately 6,400 acres to aid in the development of soil and water conservation plans.

Proper management and appropriate forest land treatment measures are planned to be applied to 110 acres of land. This will principally involve the control of woodland grazing and the installation of tree planting practices. Technical assistance to forest land users will be provided by the District Forester, Minnesota Division of Lands and Forestry, Department of Natural Resources, through the preparation of management plans for lands to receive protection or treatment measures. This technical assistance will be carried out in cooperation with the U.S. Forest Service.

Fifty percent of the land upstream of the structural measures will be adequately treated with the application of conservation practices, prior to construction of the structural measures. In addition, conservation plans will be required on 50 percent of the area prior to construction.

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<sup>25/</sup> Crop residues are that part of the crop that is left in the field after the crop has been harvested. This may include leaves, stalks, or other parts of the plant.



### Structural Measures

The structural measures planned include: one multiple-purpose flood prevention and recreation reservoir, two single-purpose floodwater-retarding reservoirs, and approximately 0.8 mile of stream channel stabilization. Recreation facilities will be provided for the recreation development planned with the multiple-purpose reservoir. (See Project Map.) Wetlands will not be affected as they are upstream of the structural measures. (See Appendix D.)

Structures R-1, R-6, and R-4A control a drainage area of 28.19 square miles of the 30.2 square miles above State Highway No. 68.

The construction of the structural measures will be in a manner that will minimize erosion during construction and preserve as many vegetative plantings as possible. All disturbed areas will be fertilized, seeded, and mulched for immediate erosion control protection. These operations will be performed concurrently during the construction with an interval not to exceed 15 days between the construction and seeding operations. Disturbed areas not scheduled for smoothing and shaping for a period of 30 days will be protected from erosion by broadcast seeding for temporary vegetative cover until final grading and shaping does occur. When disturbed areas are constructed according to plans and specifications, they will be fertilized, seeded, and mulched within 15 days as part of the project. The construction of all structural measures in this plan will comply with federal, state, and local regulations concerning air and water pollution.

A study was made of the ground water relationships in the watershed using the U.S.G.S. Hydrologic Atlas 269 as a base. Superimposed on this was data gathered from 50 farm wells in the area. The general ground water movement is to the northeast. With the addition of the structures, a minor amount of additional water will recharge these aquifers. The recharge water will be the same water that normally recharges the aquifers. The amount is expected to increase slightly due to ponding of the floodwaters. Studies have shown that surface water, when entering the ground, becomes much higher in quality due to the filtering effect of the soils such as found in this area. Observation wells will be installed below some of the structures to observe any possible hydrostatic pressure buildup. These wells could also be used to monitor water quality if desired.

As part of the design of the dams, a downstream toe drain may be installed to pick up any seepage that may make its way under or around the dam. Such a drain consists of a sand-gravel filter outletting into a pipe which in turn outlets into the stream. This water is of ground water temperature - very cool, and of high



quality. The structural data on Table IX gives additional information about the 3 planned dams.

Provisions of Public Law 86-523 relating to the preservation of historical and archeological data will be followed. The archeological site No. 21-Y.M.-27, as designated by the Minnesota Historical Society, will not be affected by the proposed project. Should any historic or archeological artifact be uncovered during construction, the Secretary of the Department of the Interior, and the State Historic Preservation Officer will be notified and an appropriate agreement will be made regarding steps to be taken.

#### Single-Purpose Flood Prevention Structure R-4A

Structure R-4A is planned to provide flood protection for the northwest part of Canby. The structure will control the runoff from a 2.36 square mile drainage area and is designed to store the accumulated sediment for a 100-year period. The principal spillway for the structure will have a crest elevation at the 50-year sediment pool level making this the permanent water level for the first 50 years.

The emergency spillway is expected to operate on an average of once in 100 years. There is a total available storage of 505 acre feet up to the emergency spillway, 216 acre feet for sediment, and 289 acre feet for floodwater detention.

The earth embankment will be approximately 39 feet in height, creating a 22-acre sediment pool and a 62-acre flood pool. It will require approximately 125 acres of land including: 74 acres cropland, 49 acres pastureland, and 2 acres in miscellaneous use.

#### Single-Purpose Flood Prevention Structure R-6

Structure R-6 is planned upstream from R-1, and will assist R-1 in providing flood protection to Canby and agricultural areas downstream. The structure controls the runoff on 15.46 square miles of drainage area. It is designed to store the accumulated sediment for a 100-year period. The principal spillway will have the crest elevation at the 100-year sediment pool level. The structure is planned with a dry sediment pool. The principal spillway riser of R-6 is planned with a series of small ports commencing 4 feet above the floor of the riser and progressing upward. As the pool area fills with sediment, the lower ports will be closed off. The principal spillway consists of a 42 inch diameter reinforced concrete conduit 330 feet long. The principal spillway and riser will serve as a barrier to prevent warm water species from migrating upstream.

The emergency spillway is expected to operate an average of once in 100 years. This reservoir will store 391 acre feet of sediment and 2,206 acre feet of floodwater for a total of 2,597 acre feet of storage up to the emergency spillway.

Table IX - Structural Data

Item	Unit	Structures							
		R-6 1/ 2/		R-1	R-4A 2/		Total		
		50 yrs.	100 yrs.		50 yrs.	100 yrs.	50 yrs.	100 yrs.	
<b>Sediment Pool</b>									
Surface Area	Acres	26	37	89	13	22	39	148	
Maximum Depth	Ft.	16	24	25	19	25	-	-	
Average Depth	Ft.	8	10	12	9	10	-	-	
Stream Length Inundated	Ft.	3,300	4,000	6,200	4,100	5,100	7,400	15,300	
<b>Recreational Pool</b>									
Surface Area	Acres	-		147	-		-	147	
Maximum Depth Before Sedimentation	Ft.	-		35	-		-	-	
Maximum Depth After 100 yr. Sedimentation	Ft.	-		10	-		-	-	
Average Depth Before Sedimentation	Ft.	-		15	-		-	-	
Average Depth After 100 yrs. Sedimentation	Ft.	-		8	-		-	-	
Stream Length Inundated	Ft.	-		8,600	-		-	8,600	
<b>Flood Pool At Emergency Spillway Crest</b>									
Surface Area	Acres		130	217		62		409	
Maximum Depth Before Sedimentation	Ft.		52	10		14		-	
Maximum Depth After 100 yrs. Sedimentation	Ft.		28	10		8		-	
Average Depth Before Sedimentation	Ft.		20	8		6		-	
Average Depth After 100 yrs. Sedimentation	Ft.		17	8		5		-	
Stream Length Inundated	Ft.		6,200	11,400		6,400		24,000	

- 1/ Structure designed with drawdown features to provide a dry dam. The lowest inlet will be 4 feet above the bottom of the riser.
- 2/ Principal spillway crest will be raised to 100-year sediment pool at end of 50 yrs.



The structure will have a 61-foot high earth embankment, creating a 37-acre dry sediment pool and a 130-acre flood pool. It will require approximately 225 acres of land including: 53 acres cropland, 142 acres pastureland, 26 acres woods and brushland, and 4 acres in miscellaneous use.

The installation of the structure will necessitate the relocation of a farming operation. The dam and flood pool will occupy the majority of the owner's land including the farmstead. The relocation will be made in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Public Law 91-646).

#### Multiple-Purpose Structure R-1

Structure R-1 is planned for floodwater-retarding and recreation use. This structure is located downstream from R-6 and will control an additional 10.37 square miles of drainage area. Total area controlled above structure R-1 is 25.83 square miles.

The structure is designated for a useful life of 100 years. Available storage up to the emergency spillway provides 1,026 acre feet for sediment, 1,203 acre feet for recreation, and 1,776 acre feet for floodwater detention, for a total storage of 4,005 acre feet. The emergency spillway will operate on an average of once in 100 years.

The structure will have a 56-foot high earth embankment which will create a 147-acre recreation pool and a 217-acre flood pool. The lake will have an initial maximum depth of approximately 40 feet. The structure and recreation facilities will require approximately 670 acres of land including: 418 acres of cropland, 183 acres of pastureland, 47 acres of woods and brushland, and 22 acres in miscellaneous uses.

The structure will have a cold water release incorporated to maintain the trout fishery downstream. A drawdown device for structure maintenance and management of the created warm water fishery will also be provided.

#### Recreation Facilities

The recreational development is planned on 275 acres of land adjacent to the 147-acre lake created by structure R-1. The types of recreation planned include: picnicking, overnight camping, boating and canoeing, fishing, swimming, and hiking. Basic facilities include: picnic tables, grills, toilets (flush and vault), garbage stations, playground equipment, boat launch and dock, swimming beach and bathhouse, parking areas and paved access roads, sewer lines connected to the city sewer system, electricity, water supply, and trails. Provisions will be incorporated to provide the necessary features to insure facilities are available for use by the handicapped. All critical erosion areas will be



treated with appropriate measures. Fifty acres of clump woody plantings will be installed to offset the loss of 35 acres of woody cover inundated by the 147-acre lake. The water supply will be obtained from wells located in the sand and gravel aquifers of the glacial till. All recreational facilities will be designed and constructed in accordance with the Minnesota State Health Department standards.

The installation of the multiple-purpose structure and associated recreation facilities will cause the relocation of a farming operation. The flood pool and recreation area will occupy the majority of the owner's land including the farmstead. The relocation will be made in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policy Act of 1970 (Public Law 91-646).

#### Stream Channel Stabilization

Two grade stabilization structures and 0.8 mile of stream channel stabilization will be installed in Canby Creek from State Highway No. 68 downstream to the first north-south township road. The purpose of the measure is to prevent streambank and channel bottom erosion expected to be accelerated by the release of water from structure R-1. Longer duration flows carrying less sediment load will subject the channel stability to greater stress. One grade stabilization structure will be installed near the sand and gravel plant in the northeast part of Canby. The other structure will be located approximately 0.5 mile upstream.

Both structures are planned as concrete box inlets to culverts. The lower structure is planned with a road crossing to replace the present crossing.

The structures are designed to pass the flow of a 100-year frequency flood event. They will operate as island-type structures which provide an emergency spillway should the inlet boxes become clogged with ice and/or trash.

The channel modification will be limited in amount to provide a sufficient approach and exit channel for the grade stabilization structures. This channel will have a bottom width of 32 to 35 feet, 2 to 1 side slopes, and a depth of eight feet. Riprap will be placed on the inlet areas of both structures.

The existing channel would provide 100-year frequency flood-free protection with structure R-1 in place. The proposed channel modification is designed to provide a stable channel regime in Canby and also provide the same 100-year flood-free protection. The spoil will be placed parallel to and 30 feet from the excavated section. It will be leveled and vegetative plantings established to provide protection from erosion. Land rights will be required on approximately 5 acres of woods and brushland and 20 acres of miscellaneous land for the stream channel stabilization.

## Nonstructural Measures

### Natural Stream Conditions on Canby Creek

With the installation of the multiple-purpose structure R-1, the channel regime of county ditch No. 8 will need the continued source of gravels to remain in balance. The portion of Canby Creek from the St. Leo Road upstream to the north-south township road will be preserved in its natural condition. Gravel and mineral rights, in addition to the other necessary land rights, will be obtained on 18 acres along the lower 2,000 feet of Canby Creek. This measure is needed to insure the necessary source of gravel material for the continued natural armor plating of the channel bed of county ditch No. 8.

### Cultural Assessment

A cultural (historic, archeological, architectural) assessment of Canby Creek Watershed will be conducted prior to beginning construction. A contract will be negotiated with the Minnesota Historical Society to conduct this survey and assessment. If affected cultural resources are encountered, a salvage and/or preservation program will be developed in association with the Sponsors, Soil Conservation Service, Minnesota Historical Society (State Historic Preservation Officer), and U.S. Department of the Interior, National Park Service.

### Water Quality Monitoring

A complete water quality monitoring program will be established to begin about one year before construction commences. The program will extend through the construction period and for about one year beyond. Samples will be obtained during low flows, storm flows, and during planting, harvesting, and growing seasons. The Soil Conservation Service and the Sponsors will seek an Environmental Protection Agency and/or state agency grant to obtain necessary funding.

The monitoring program will also obtain data required to assess the impact on downstream water quality of discharging bottom (hypolimnion) waters from structure R-1 which may be low in oxygen and high in nutrients and pollutants.

### Land Use Changes

The structural measures will require 1,063 acres of land consisting of 545 acres of cropland, 384 acres of pastureland, 84 acres of woods and brushland, and 50 acres in miscellaneous uses. The present land use in seven separate areas is shown in the following table and Appendixes E, F, and G, "Structure Area - Land Use Maps":



Table X - Land Use Commitment as Result of  
Planned Structural Measures

<u>Item</u>	<u>Cropland</u> (Acres)	<u>Pastureland</u> (Acres)	<u>Woods &amp; Brushland</u> (Acres)	<u>Misc.</u> (Acres)	<u>Total</u> (Acres)
Dams & Spillways -	90 - - -	93 - - -	1 - - -	5 - - -	189
Sediment & Rec-					
reation Pool - -	67 - - -	84 - - -	42 - - -	4 - - -	197
Detention Pools -	59 - - -	129 - - -	23 - - -	2 - - -	213
Top of Dam <sup>1/</sup> - - -	83 - - -	53 - - -	7 - - -	3 - - -	146
Recreation					
Facilities - - -	246 - - -	15 - - -	0 - - -	14 - - -	275
Channel					
Stabilization -	0 - - -	0 - - -	5 - - -	20 - - -	25
Natural Stream					
Areas - - - - -	0 - - -	10 - - -	6 - - -	2 - - -	18
<hr/>					
Total - - - - -	545 - - -	384 - - -	84 - - -	50 - -	1,063

<sup>1/</sup> Land located between the emergency spillway elevation and top of dam.

#### Operation and Maintenance

The farmers and land users are responsible for the operation and maintenance of all conservation practices installed on their land.

These practices will be maintained in a manner that will keep the soil loss within the allowable soil loss tolerance<sup>26/</sup> of the land resources.

Technical assistance to maintain these practices is available from the local soil and water conservation districts.

Structural measures will be operated and maintained by the Sponsors through necessary assessments. The Lac qui Parle-Yellow Bank Watershed District will be responsible for implementing any maintenance work. The operation and maintenance will be performed in a timely, adequate, and appropriate manner to assure efficient operation and functioning of the works of improvement for the life of the project. Annual expenses, including operation, maintenance, and replacement are estimated at \$21,070.

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<sup>26/</sup> Soil loss tolerance is the allowable soil loss in tons per acre that will maintain the soil without permanent damage. This is based on soil characteristics such as soil texture and depth.



Floodwater-retarding and multiple-purpose structure maintenance will include: repair of erosion damage from high intensity storms on the principal and emergency spillway, earth fill repairs on the silting basin, replacement of riprap, removal of debris that may affect the operation of the structures, repair of rodent damage, and the reseeding and mowing of the vegetative areas. Mowing will be delayed until after the nesting season to protect the ground-nesting birds.

Channel stabilization maintenance will include: repairing of culverts, bridges and inlets, periodical channel cleanout to maintain channel capacity, and the reseeding and mowing of the vegetative areas. Mowing will be delayed until after July 15 to protect the ground-nesting birds.

The operation of the recreation facilities will include part-time employment for custodial and policing services, and lifeguards during the swimming season. There will be replacements necessary for the basic facilities after their expected life.

On multiple-purpose structure R-1, a water drawdown device can be used to completely drain the pool for the protection and maintenance of the structure. This will be done by the Sponsors when deemed necessary.

The water drawdown device will also be used to maintain the pool as a high quality lake fishery. When improvement of this resource is recommended by the Minnesota Department of Natural Resources, the recreation pool can be lowered a maximum of five feet below the planned elevation in late fall for fishery management purposes.

The operation and maintenance of the natural stream on Canby Creek will be to provide the necessary controlled erosion. In the event the erosion becomes excessive, the Sponsors will take necessary corrective action to control the erosion.

Included as part of the operation and maintenance will be the annual joint inspections during the first three years after the installation of the structural measures by the Sponsors and the Soil Conservation Service. During this period, the Sponsors and the Service will make a joint inspection annually, after unusually severe floods, and after the occurrence of any other unusual conditions which might adversely affect the structural measures. After the three-year period, the Sponsors will make the necessary inspections. The Sponsors will correct any deficiencies found. Annual inspection reports will be made and a copy provided to the Service.

## Project Costs

The total installation cost of the plan is estimated at \$2,105,600 of which \$209,100 is for land treatment and \$1,896,500 is for structural and nonstructural measures.

The cost sharing between Public Law 566 funds and other funds is tabulated in the following table:

Table XI - Project Costs

<u>Item</u>	<u>P.L. 566 Costs</u>	<u>Other Costs</u>	<u>Total Cost</u>
Land Treatment - - - - -	<u>1/</u> \$32,400 - -	\$176,700 - -	\$209,100
<hr/>			
Structural Measures			
Construction - - - - -	973,700 - -	203,200 -	1,176,900
Engineering, Land Rights and Administration - - -	462,600 -	<u>2/</u> 257,000 -	<u>2/</u> 719,600
<hr/>			
Total - - - - -	\$1,436,300 - -	\$460,200 -	\$1,896,500
<hr/>			
Total Installation Costs - - - - -	\$1,468,700 - -	\$636,900 -	\$2,105,600

1/ Accelerated technical assistance for land treatment.

2/ Includes costs of nonstructural measures.

## 2. ENVIRONMENTAL IMPACT

### Conservation Land Treatment

Application of conservation land treatment on cropland, pastureland, and forest land will reduce the wind and water erosion, and resulting sedimentation within and downstream from the watershed. The installation of the conservation land treatment measures will adequately treat an additional 5,000 acres of cropland, 2,500 acres of pastureland, 50 acres of other land managed for wildlife, and 100 acres of forest land. The conservation land treatment measures will reduce the sediment yield from the watershed by about 50 percent.

With the application of conservation treatment measures, the average annual soil loss will be reduced to less than 4 tons per acre per year on 5,000 acres of cropland. Four tons per acre is the allowable rate. This will increase the adequately treated cropland from 1,250 acres to 6,250 acres. The remaining



3,100 acres will have an estimated average annual soil loss reduction of 2 tons per acre. This reduction from 13 to 11 tons per acre per year will be from improved farming methods.

Gully erosion will also be reduced with the application of land treatment measures. The land voided from gully erosion will be reduced from 0.3 to 0.1 acre per year.

Installation of land treatment practices, such as stripcropping, minimum tillage, field windbreaks, and wildlife habitat management, will provide improved habitat for upland game, waterfowl, songbirds, and other wildlife. Application of these practices will increase food and cover throughout the watershed.

#### Structural Measures

Ninety-three percent of the watershed upstream from the major damaged areas will be controlled by reservoirs. The combination of conservation land treatment and the structural measures will provide 100-year frequency flood protection to 145 residence and business properties in Canby. Cropland and pastureland flooded by the 100-year frequency event within the watershed will be reduced from 470 to 100 acres on 10 farms. The reduction of flooding from a 5-year frequency flood event will be reduced from 170 to zero acres while the 2-year frequency event will be reduced from 70 to zero acres.

Areas subject to flooding between the watershed outlet and the Lac qui Parle River will be reduced from 4,730 to 3,610 acres for the 100-year frequency flood on 40 farms. Although the structures reduce the area and depth of flooding, the longer duration of flow from the structures will cause flooding for longer periods of time in areas of limited channel capacity. Without the project, the 5-year frequency flood event will inundate 3,450 acres of which 290 acres are flooded for 2 days. With the project installed, this storm is expected to flood 2,680 acres, increasing the inundation of 290 acres to 3 days. For the 2-year frequency event, 2,480 acres are inundated under present conditions of which 180 acres are inundated for 2 days. After installation of the project, 1,870 acres would be flooded with the 180 acres inundated for 2½ days.

Average annual damages to roads and bridges will be reduced by 80 percent at 15 locations. Ten of these are in the watershed.

The structural measures and land treatment will reduce the sediment delivered to the Lac qui Parle Reservoir from Canby Creek Watershed from 28,000 to 4,400 tons per year.

Other agricultural damages such as fence damage, removal of debris and weed infestation, will be reduced by 90 percent within the watershed and 24 percent below the watershed.



It is not known precisely how a floodwater-retarding structure, with pasture and cropland behind it, will affect downstream water quality. The structures are expected to act as settling basins for nutrients, pesticides, and coliforms.

The dam and emergency spillway of structure R-1 will require the use of about 70 acres of cropland, 50 acres of pastureland, 1 acre of streamside wooded habitat, and 2 acres of gravel pits and roads. After construction of the dam and spillway, these areas will be planted to permanent grass.

The recreational pool will replace about 46 acres of cropland, 63 acres of pastureland, 34 acres of streamside wooded habitat, and 4 acres of gravel pits and roads with water. The area subject to temporary flooding up to the top of the dam and the recreation development will require about 302 acres of cropland, 70 acres of pastureland, 12 acres of streamside wooded habitat, and 16 acres in miscellaneous uses including a farmstead. Land use on 297 acres of cropland and 27 acres of pastureland will be changed to woody plantings and grass. These woody plantings and grassland areas will provide 324 acres of food and cover for numerous wildlife species such as deer, songbirds, rabbit, and fox. No change is expected on the remaining acreage. Approximately 11,400 feet of channel and streamside habitat will be inundated with the construction of the reservoir. There will be 8,600 feet inundated with the recreation pool and 2,800 feet subject to flooding in the temporary flood pool. This segment of channel is classified as a trout stream. A warm water fishery capable of supporting pan fish as well as largemouth bass and catfish will be created by the 147-acre lake. The water-based recreation development will provide 47,800 recreation visits annually. The peak daily use is expected to be 835 visits. The use of the development will result in increased traffic in the area accompanied by the usual noise, solid waste and air pollution. Appendix E contains a map of site R-1 showing present uses of land areas which are subject to changes as described above.

The dam and spillway of structure R-6 will replace about 10 acres of cropland, 38 acres of pastureland, and 3 acres of miscellaneous land uses. After construction of the dam and spillway, these areas will be planted to grass. The sediment pool will replace about 21 acres of cropland, 3 acres of pasture, and 8 acres of woods and brushland. The area subject to temporary flooding up to the top of dam will require 22 acres of cropland, 96 acres of pastureland, 18 acres of woods and brushland, and 10 acres in miscellaneous uses. Approximately 6,200 feet of channel and streamside habitat will be inundated temporarily by the floodwaters with the construction of R-6. This segment of channel is classified as a trout stream. The periodic flooding in the temporary flood pool will prohibit intensive use of this land. Most will revert to grasses and brushland which provide habitat for numerous wildlife species such as deer, songbirds, rabbit, and fox. Appendix F shows present land uses.

The sediment pool will be subject to frequent water level fluctuation and sediment deposition. This condition will result in the growth of water tolerant grasses, sedges, and other aquatic plants. This will provide habitat for mammals, amphibians, reptiles, and birds.

The water releases from structure R-6 will be relatively silt-free. Some reassimilation of sediment can be expected from the channel down to structure R-1. The natural channel between structures R-6 and R-1 passes through mostly wooded and grass pasture reaches with very little cultivated fields. The channel bottom through this reach is lined with glacial boulders, cobbles, and gravels for the most part. The cobbles and boulders will prevent serious channel degradation from developing in the reach due to the clearer water releases from structure R-6. The wooded and grass banks over most of the reach will also retard streambank erosion.

The reassimilation of sediment was provided for in the calculation of the sediment storage requirement for structure R-1.

The dam and spillway of structure R-4A will replace about 10 acres of cropland and 5 acres of pastureland. After construction these areas will be planted to grass. The sediment pool will replace about 13 acres of pastureland with water. In addition, 31 acres of pastureland, 64 acres of cropland, and 2 acres in miscellaneous uses in the flood pool up to the top of the dam will be subject to temporary flooding. Approximately 6,400 feet of channel and streamside habitat will be temporarily inundated by the floodwaters with the construction of R-4A. The periodic flooding in the temporary flood pool will prohibit intensive use of this land. Most of this temporary pool area will revert to brushland and grasses which provide food and cover for various species of wildlife. (See Appendix G.)

Initially, the sediment pool will store water creating a Type V<sup>27</sup>/ wetland, supporting aquatic plants, such as cattails, bulrushes, and arrowhead. This will provide a brooding area for waterfowl and shore birds as well as mammals such as mink, raccoon, and muskrat.

The stream channel stabilization will eliminate the existing streambank and channel erosion in Canby and provide a stable regime with the installation of structure R-1. There will be 5 acres of woods and brushland and 20 acres of miscellaneous land committed for the channel in Canby.

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<sup>27</sup>/ Wetlands of the United States, Fish and Wildlife Circular 39, United States Department of the Interior, pp. 21 and 22.



The land rights on the natural stream area on Canby Creek will protect the area from any future development or other uses. It will also provide the necessary gravel sources for the continued armor plating<sup>28/</sup> of county ditch No. 8. There will be 10 acres of pastureland, 6 acres of wood and brushland, and 2 acres of miscellaneous land committed to the natural stream area on Canby Creek.

The annual damages will be reduced by 88 percent in the watershed and 17 percent downstream by the project conditions for the 50 farmland users.

#### Economic and Social

The project will provide economic and social benefits and contribute to rural development by providing more stable income from local sources. Employment opportunities will be provided by the installation of the project and the operation, maintenance, and replacement of the structural and recreational measures. Incomes will be more stable for the affected land users as well as for the local industries that handle the increased production of crops and those providing the needed inputs for the increased crop production and for the recreational development. The improved livability within the watershed will provide more incentive for the present population to remain in the area.

The hazard of loss of life from unexpected floods will be virtually eliminated, with normal precautions for personal safety.

The project will cause two farm families to relocate. Relocation for these people will involve the normal costs, anguish, and disruptions of living patterns associated with transfers and the establishment of a home at a new location. Membership in a church, local organizations, or groups may need to be transferred as well as the children being transferred to another school system. Time may be required to establish an efficient farming enterprise.

These relocations may have a minor effect on the local community in the form of reduced local revenues for local governmental units, schools, and churches.

With project installation, the removal of approximately 690 acres of land from agricultural production for the structural and recreational measures will reduce the net income to the land users by \$18,700 annually. No compensation will be provided for the loss in profits of the basic and service industries, however, this loss will be partially replaced by the increased demands for goods and services associated with the recreational development.

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<sup>28/</sup> Natural lining of a channel in conjunction with and resulting from streamflow.



The farmowners will be compensated for this loss by the Sponsors in the form of land rights payments.

A total of 615 acres of land will be placed in public ownership. This will reduce the tax base for township and county governments.

3. FAVORABLE ENVIRONMENTAL EFFECTS

- A. Reduce erosion on 7,500 acres of cropland and pastureland.
- B. Reduce floodwater damages to 145 businesses and residences in Canby.
- C. Reduce flooding on 5,200 acres of flood plain land.
- D. Reduce floodwater damages to 15 roads and bridges.
- E. Reduce sediment deposition in Lac qui Parle Reservoir.
- F. Reduce other agricultural floodwater damages.
- G. Provide opportunity for 47,800 recreation visits annually.
- H. Provide a warm-water fishery.
- I. Improve upland game and waterfowl habitat.
- J. Reduce floodwater damage to crops and pasture.

4. ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED

- A. Increase duration of flooding on downstream low-lying areas.
- B. Reduce natural habitat on approximately 4½ miles of channel.
- C. Eliminate 690 acres from agricultural production.
- D. Increase noise, solid waste, and air pollution.
- E. Permanently inundate 1½ miles of trout stream.

5. ALTERNATIVES

Alternatives considered as part of the development plan are as follows:

Land Treatment

The use of conservation land treatment measures was considered as the first alternative. The cost of the land treatment measures is estimated at \$209,100. Such measures as conservation cropping systems, contour farming, terraces, minimum tillage, grassed waterways, field windbreaks, and related measures would provide essentially the same reduction in sheet erosion on the uplands as the planned project. This alternative would reduce the average annual floodwater damages by about \$2,700. This represents about 2 percent of the floodwater damages that are occurring within and downstream of the watershed.

Combination Flood Plain Zoning and Flood Insurance

A combination of flood plain zoning and flood insurance was considered as one of the alternatives. This would prevent additional buildup in flood-prone areas and would mitigate damages to existing residential properties in the flood plain. Cost of this alternative

was estimated to be \$20,000 annually. Reimbursed damages would amount to about \$13,000 annually. Other flood damages not covered by flood insurance would be about \$122,000 annually.

#### Single-Purpose Flood Prevention Structures and Land Treatment

This alternative consists of 3 single-purpose floodwater-retarding structures at the same locations as shown on the Project Map. Structure R-1 was modified to include a dry sediment pool. Average annual cost of this alternative is estimated to be \$68,000. This alternative would provide a level of flood protection identical to that of the selected plan. The impacts of this alternative are:

1. Eliminate a quarter mile of trout stream.
2. Remove 360 acres from agricultural production.

#### No Project

The alternative of not having a project is also to be considered. The existing land and water resource problems would continue.

The present ongoing program in the application of conservation practices would be continued. However, the application rate would only be approximately 40 percent of what would take place during the project installation period.

The proposed plan would provide average annual benefits of \$146,500 at an average annual cost of \$123,560. A total of \$22,940 in average annual net benefits would be foregone by not implementing the plan.

#### 6. RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

The plan provides for a level of protection consistent with the present and projected use of the land in the watershed. The population of Canby is projected to increase by about 50 percent by the year 2000.<sup>29/</sup> The level of protection provided by this project can be used as a base for additional measures if the economic conditions demand more intensive use.

The sediment storage designed in the structures will provide full design flood storage and effectiveness through the one hundredth year or end of the project evaluation period. However, the structures will continue to furnish flood reductions on a diminishing basis for a much longer time until the flood storage

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<sup>29/</sup> Minnesota Population Trends, Estimates, Projections - Minnesota Department of Health, March 1972.



volume is replaced by sediment. The recreation storage of R-1 will also retain its full effectiveness through the hundredth year and will continue to provide recreation value on a diminishing basis thereafter.

The project will provide minimal reduction in flooding on the Lac qui Parle River since the structures control only 9.6 percent of the drainage area at the confluence of Lazarus Creek and the Lac qui Parle River and only 2.7 percent of the drainage area at the mouth of the Lac qui Parle River. The effects of the project on flooding on the Minnesota River are insignificant.

The Upper Deer Creek-Lake Hendricks Watershed project is also located in the Lac qui Parle River Basin. The cumulative effects of these projects in the Lac qui Parle River Basin are minimal.

The watershed is within the Minnesota River Subregion of the Upper Mississippi River Water Resource Region as designated by the Water Resources Council.

Status of the Public Law 83-566 Watershed Program within the Minnesota River Subregion of 16,900 square miles includes four projects with a combined drainage area of 250 square miles which have been authorized for installation, three projects, including the Canby Creek Watershed Project, with a combined drainage area of 294 square miles which have been authorized for planning, and seven projects having a combined drainage area of 1,273 square miles which have been placed on priority for planning by the State Soil and Water Conservation Commission. The projects authorized for planning and authorized for installation represent about 3 percent of the total subregion area and will have negligible cumulative effects.

#### 7. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

There are about 1,063 acres of cropland, pastureland, woodland, and brushland used for the dams, spillways, sediment pools, recreation pool, flood pools, recreation facilities, and channel stabilization. Acres of land use committed to the structural measures are shown in Table XII.

There are 35 acres of streamside woody habitat in site R-1 that will be converted from terrestrial habitat to aquatic habitat. Approximately 350 acres of cropland and 120 acres of pastureland in the temporary pool areas of 3 sites will be converted to natural terrestrial habitat.



Table XII - Present Land Use Committed to Structural Measures

<u>Structure</u>	<u>Cropland</u> (Acres)	<u>Pastureland</u> (Acres)	<u>Woods &amp; Brushland</u> (Acres)	<u>Misc.</u> (Acres)	<u>Total</u> (Acres)
R-1 - - - - -	418 - - - -	183 - - - -	47 - - - -	22 - - - -	670
R-4A - - - - -	74 - - - -	49 - - - -	0 - - - -	2 - - - -	125
R-6 - - - - -	53 - - - -	142 - - - -	26 - - - -	4 - - - -	225
Channel					
Stabilization -	0 - - - -	0 - - - -	5 - - - -	20 - - - -	25
Natural Stream					
Area - - - - -	0 - - - -	10 - - - -	6 - - - -	2 - - - -	18
<hr/>					
Total - - -	545 - - - -	384 - - - -	84 - - - -	50 - - - -	1,063

There will also be 4½ miles of stream committed to the dams, sediment pools, recreation pool and detention pools. During periods of flood-producing storms in the watershed, there may be as much as 359 acres of land inundated in the flood pools of these dams. This periodic flooding will prohibit some intensive land uses. Land areas occupied by dams, sediment pools, recreation pool, emergency spillways, and channel stabilization are permanently committed. This includes 18 acres of sand and gravel mineral rights along Canby Creek that will be retained in its natural state to insure a continuing supply of stabilizing gravels to county ditch No. 8 below the project for the life of the project. Ample reserves of sand and gravel exist in the area to meet projected demands.

All land developed under Public Law 83-566 with federal cost-sharing cannot be sold or disposed of during the evaluated life of the project except to a public agency which will continue to maintain and operate the development for its intended use.

#### 8. CONSULTATION WITH APPROPRIATE FEDERAL AGENCIES AND REVIEW BY STATE AND LOCAL AGENCIES DEVELOPING AND ENFORCING ENVIRONMENTAL STANDARDS

##### A. General

The application for assistance under Public Law 83-566 was submitted to the Minnesota State Soil Conservation Committee (now the State Soil and Water Conservation Commission) for the Governor of Minnesota on April 2, 1964. The State Committee placed the application on priority for planning on June 10, 1966. On February 8, 1968, the preliminary investigation was presented at a public meeting in Canby. On February 22, 1968, the Sponsors held another meeting and decided to proceed with development of a Public Law 83-566 plan.

During the development of the plan, concern was raised by the Minnesota Department of Conservation (now Department of Natural Resources) about planning a multipurpose dam on an annually stocked trout stream. After reviewing this in the field with the Minnesota Department of Natural Resources, it was agreed the dam was satisfactory if a cold water release was incorporated as part of the development. This was agreed to by the Minnesota Department of Natural Resources, Fish and Wildlife Service, and the Soil Conservation Service.

The Minnesota Historical Society (State Historic Preservation Officer) was contacted for any known archeological information they had on record which might be affected by this project.

Several meetings were held with the Sponsors and concerned land users to develop a plan satisfactory to them. The Sponsors called a public meeting on June 14, 1972, to review the proposed work plan with the public and concerned agencies and organizations. Based upon the review and favorable comments received at this meeting, the Sponsors decided to take the necessary steps to implement the plan.

B. Discussion and Disposition of Each Comment on Draft Environmental Impact Statement

The following agencies, groups, and individuals were requested to comment on the draft environmental statement and did not respond with any comments:

Department of Commerce  
Department of Health, Education and Welfare  
Federal Power Commission  
Minnesota Environmental Quality Council  
Minnesota Pollution Control Agency  
Minnesota State Soil and Water Conservation Commission  
Minnesota Water Resources Board  
Minnesota Association of Watershed Districts  
Minnesota Association of Counties

The following agencies, groups, and individuals were requested to comment on the draft environmental statement and provided the following comments:

1. Department of the Army (Corps of Engineers)

Comment::

We have reviewed the work plan and foresee no conflict with any projects or current proposals of this Department. In view of the proximity of the proposed project to Canby, and considering possible loss of life or damage should the structure fail, it is suggested that the emergency spillway be reevaluated during final



design. The draft environmental statement is considered to be satisfactory.

Response:

The emergency spillway and the dam will both be evaluated and designed in more detail in the final design. Because of the proximity to Canby, the structure will be designed in accordance with Soil Conservation Service high-hazard criteria.

2. United States Department of the Interior

The following refers to comments on the work plan.

Comment:

The watershed work plan adequately reflects the views of the Fish and Wildlife Service relative to the structural aspects of the proposal. However, the work plan does not include sufficient measures to insure protection of the fish and wildlife resources from the nonstructural measures (land treatment) which are to be implemented. Of particular concern is the possibility that implementation of the land treatment measures could result in drainage of wetlands located in the southwestern part of the watershed. These wetlands are used for nesting and feeding purposes by various species of migratory waterfowl which are afforded international protection by the Migratory Bird Treaty Act of 1918, as amended, 16USC701-711.

Response:

Soil Conservation Service policy prohibits service personnel from providing technical assistance to landowners and operators who wish to drain type III, IV, and greater wetlands. Technical guidance of Service personnel is directed toward maintaining and/or improving these wetlands for wildlife habitat.

The Service has no control over land use; therefore, cannot dictate how landowners manage their holdings. However, the Soil Conservation Service and most soil and water conservation districts in Minnesota are dedicated to fish and wildlife management and preservation.

It is suggested that the Department of the Interior, through ongoing programs of the Fish and Wildlife Service, can assist in this endeavor. They have programs to purchase land, technical expertise, and manpower.

Comment:

The second complete paragraph on page 14 indicates that certain wildlife wetland habitat management practices will be used. A



thorough coverage of the planned practices should be set forth in the report covering such things as what practices are intended, how the areas will be treated, and how much land will be affected. Numerous references are made to plantings that will be beneficial to wildlife in the report, but these plantings must be identified as to type and quantity if the reviewers are to be able to assess the effects of this planting effort. Further, information as to who will be committed to do the planting, who is to fund the work and when, is needed to demonstrate that the program will become a reality rather than a desirable but optional proposal.

Response:

Page 14, Table VIII, lists two state-owned wildlife management areas of 66 and 313 acres each. It is assumed these areas are managed and treated properly by the State Department of Natural Resources, Division of Game and Fish.

Normal Soil Conservation Service operating procedures will be used to implement wildlife plantings on private lands, as is indicated in the Planned Project, Land Treatment Measures section of the statement. (See Page 20 through 22.)

Comment:

We believe the evaluation of the impact of the proposed action on the hydrologic environment is accurate and sufficiently complete. We can see no significant deleterious effects on the hydrology of the area as a result of the proposed project; in fact, many benefits would accrue.

Response:

No response required.

Comment:

The proposed project will not adversely affect any existing or proposed units of the National Park System nor any sites being considered for inclusion in the National Historic, Natural or Environmental Education Landmark Programs. No substantial involvement with the mineral resources or related industries is contemplated. The proposal does not appear to impact on any Indian lands which would affect the trust responsibilities of the Secretary of the Interior.

Response:

No response required.

The following refers to comments on the draft environmental impact statement.

Comment:

We believe the statement is deficient in its discussion on the fish and wildlife resources of the study area and in those sections which assess and identify the impacts of structural and nonstructural measures on these resources. Fish and wildlife habitats are described in rather general terms. The inclusion of a map which shows present habitat types in the vicinity of the structural measures would improve this aspect of the statement presentation. The map should also show the locations of wetlands lying within the watershed boundary which may be affected by the proposal.

Response:

The fish and wildlife resources of the study area have been clarified on pages 11 through 14.

Impacts of nonstructural measures on wildlife resources are discussed on page 32, paragraph 3.

Impacts of structural measures on wildlife resources are discussed on pages 33 and 34. Appendixes E, F, and G have been added to clarify areas discussed in this section.

A wetlands inventory map has been prepared showing wetlands enumerated in Table V, page 8 and 9. It is attached as Appendix D.

Comment:

We believe the environmental statement to be inadequate in its attention to cultural (historic, archeological, architectural) resources. Aside from consultation of the National Register of Historic Places and correspondence with the State Historic Preservation Officer, it appears that no effort was made to undertake the sort of interdisciplinary investigation of cultural resources and of project effects upon them during planning required by the National Environmental Policy Act. The extent to which cultural resources may be adversely affected by the project, then, is undetermined. Accordingly, we maintain that an investigation of the affected area must be undertaken by persons professionally trained to locate, identify, and evaluate historic, archeological, and architectural resources. The results of the survey should be sufficient to provide a substantive description of affected cultural resources, an assessment of the effects of the project upon them, and a program of measures that will be instituted to avoid or mitigate adverse effects to the extent possible. A large part of this effort may take the form of an archeological survey and salvage program prior to construction. We also note that even in the case of the one cultural resource identified through correspondence, the statement is silent concerning the



relation of that site to the project. The statement should describe the project effects on the site, and if it will be adversely affected, describe what measures will be taken to mitigate the problem through avoidance or other protection, or through salvage excavation to recover data and materials should adverse effects be unavoidable.

Response:

See page 28, paragraph 2, for proposed compliance to the National Environmental Policy Act. It has been previously stated that no damage will occur to the one mentioned cultural resource on page 24, paragraph 2.

Comment:

Environmental impacts related to geologic conditions appear to have been adequately considered in the draft environmental statement and work plan.

Response:

No response required.

Comment:

The draft statement has used information from U.S. Geological Survey Hydrologic Atlas 269, Water Resources of the Lac qui Parle River Watershed, and it has been properly referenced.

Response:

No response required.

Comment:

The draft statement includes a descriptive section, "Environmental Setting", that deals in part with the physiography and soils of the area. It also makes brief mention (page 3, paragraph 9) of sand and gravel resources in the project area. The size and location of such deposits are not discussed. Both the plan and the statement mention sand and gravel deposits along Canby Creek for which mineral rights are to be obtained. The description and size of these deposits and any others affected by the project, should be included in the environmental statement. Acquisition of mineral rights involves the irreversible commitment of these natural resources for the life of the project. In the area of acquisition of mineral rights, the Departments of the Army and Interior have a long-standing agreement that mineral rights at reservoir sites will be acquired only when necessary for the primary purpose of the project and for public access. In other lands in the project area, mineral rights would be subordinated to the project purpose. Discussion of these gravel



deposits, plus mention of construction minerals committed to the structural measures should be included in section 7, Irreversible and Irretrievable Commitments of Resources.

Response:

The Environmental Impact Statement has been enlarged to include a discussion of sand and gravel resources in the Canby area under Environmental Setting, page 4, paragraph 4 and 5, and the mineral rights required on page 28, paragraph 1, and page 35, paragraph 1.

A statement has been inserted in section 7, the first paragraph of page 39, describing the size, purpose, and location of the mineral rights and the effects on the total sand and gravel reserved for this portion of Yellow Medicine County.

Comment:

There does not appear to be a substantial involvement of mineral resources in this project, but the draft environmental statement should contain enough data to support such a conclusion. We recommend the addition of a few paragraphs in the descriptive section and in section 7 to cover the geology and both the existing and potential mineral deposits within the project area. Such data will provide the input to assess adequately the project's impact on present and future recovery of mineral resources.

Response:

The Environmental Impact Statement was enlarged to include a discussion of sand and gravel resources under Environmental Setting, page 4, paragraphs 4 and 5. A statement was inserted in section 7, "Irreversible and Irretrievable Commitments of Resources", describing the project on present and future recovery of mineral resources. The impacts are discussed on page 35, paragraph 1.

Comment:

Environmental Impacts

One area which has a real potential for environmental impact is the nonstructural features of the project. Although some land treatment measures carry obvious beneficial environmental impacts, others, such as tilling and ditching, adversely affect wildlife habitat. Of particular significance would be land treatment effects on the numerous small wetlands found in the upper section of the watershed. Wildlife management practices that will be used on the additional habitat planned for the study area should also be detailed in this section.

Response:

a. The Soil Conservation Service has no control over land use; therefore, cannot dictate how landowners manage their holdings. Soil Conservation Service policy prohibits Service personnel from providing technical assistance to landowners and operators who wish to drain type III, IV, and greater wetlands. It is suggested the Department of the Interior, Fish and Wildlife Service, purchase these wetlands under one of their ongoing programs and manage them as they see fit. However, the soil and water conservation districts of Minnesota, with technical assistance from the Soil Conservation Service, will continue to promote wildlife wetland development through their ongoing program.

b. Wildlife habitat management practices will be coordinated with the Minnesota Department of Natural Resources. In general, these will entail delayed mowing of grasslands to protect ground-nesting birds and enhance possibilities of nesting success.

c. Additionally, controlled burning and grazing may be utilized (at the D.N.R.'s and Sponsors' option) to control successional grassland stages.

d. Woody cover plantings will incorporate native species as determined in consultation with the Department of Natural Resources and managed to maintain a brushy understory of value to wildlife.

Comment:

We recommend that the final statement quantify the acres of wildlife habitat to be created or improved as a result of the proposed land treatment measures. For example, page 28 mentions only 50 acres of land are to be managed for wildlife. It would appear that land treatment measures, when applied throughout the watershed, would have beneficial effects on more than 50 acres of wildlife habitat.

Response:

See page 32, paragraph 3, for response.

Comment:

We suggest that the final statement contain a more detailed discussion of the project's impact on natural habitat of both streamside wooded areas and stream channel should be set forth in the final statement.

Response:

This comment has been responded to on page 33, paragraph 3 and 4, and page 34, paragraph 4.



Comment:

The proposed recreational impoundment for the multipurpose reservoir would raise groundwater levels in the immediate area above the dam but we do not believe this would have an adverse impact. Secondary effects would probably result from utilization of the reservoir; but in this area, adequate safeguards are proposed to retain a healthy hydrologic environment.

Response:

We agree. No further response is required.

Comment:

Irreversible and Irretrievable Commitment of Resources

This section should contain a detailed discussion of the fish and wildlife resources that will be lost or degraded by each of the structural measures listed in the table on page 34. This section should also make it clear that the losses identified are of a permanent nature.

Response:

There are 35 acres of streamside woody habitat in site R-1 that will be converted from terrestrial habitat to aquatic habitat. Approximately 350 acres of cropland and 120 acres of pastureland in the temporary pool areas of 3 sites will be converted to natural terrestrial habitat.

3. Department of Transportation

Comment:

The Department of Transportation has reviewed the draft statement. We have no comments to offer nor do we have any objection to the statement.

Response:

No response required.

4. Environmental Protection Agency

Comment:

Environmental Setting

The weather data provided should be expanded to indicate minimums and maximums for annual rainfall as well as amounts of



rainfall experienced in 5, 7, and 100-year frequency floods. The EIS indicated that portions of the watershed are subject to wind erosion. Data on the direction and velocity of prevailing winds should be provided to make it possible to evaluate the seriousness of this hazard with respect to the proposed project.

Response:

This has been accomplished on page 4, paragraphs 1, 2, and 3.

Comment:

Water Quality

The EIS should address the effects that flooding crop and pastureland behind floodwater-retarding structures could cause on downstream waters. Excessive nutrients could create undesirable algal growths in the impoundments and downstream. Water quality data for Canby Creek should be determined for levels of total coliform, fecal coliform, phosphates, nitrates, pesticides, and biological oxygen demand. The segment of Canby Creek on which the proposed project would be constructed is a trout stream and presently classified as 2A (Classification of Interstate Waters of Wisconsin, WPC 25, MPCA). The EIS should present the applicable State water quality criteria (WPC 15) for the above classification and should provide data to substantiate that existing water quality for Canby Creek will not be degraded.

Response:

A water quality monitoring proposal is presented in the narrative portion of the environmental impact statement on page 28, paragraphs 3 and 4.

The applicable state water quality criteria (WPC 15) has been included as Appendix H.

Comment:

We encourage implementation of the following measures to maintain a viable trout stream upstream of the R-6 impoundment and between the R-6 and R-1 impoundments: plans for a drop structure to prevent warm water species from migrating upstream to the trout area; restriction of cattle grazing in the immediate area of the stream. Also, we concur with plans for a cold water release from R-6, but believe the EIS should address the potential impact on downstream water quality of discharging bottom (hypolimnion) waters which may be low in oxygen and high in degrading nutrients and pollutants.

Response:

The principal spillway on R-6 is planned as a fish barrier. See planned action section, page 24, paragraph 6.

Before final designs are complete, a decision will be reached through consultation with local Sponsors, Minnesota Department of Natural Resources, and the Soil Conservation Service, on how the structure should be designed.

At present, no barrier is planned upstream of the pool areas on site R-1. At the same consultation session, a decision can be reached on the need for, location, and design feature of this barrier.

The water-monitoring program, as set forth on page 28, paragraphs 3 and 4, will determine the actual nutrient and pollutant levels of any water discharged from the dams.

Comment:

The EIS should discuss the proposed impoundments in relation to the region's water table. If seepage is expected to occur, a brief description should be included of how it will be controlled and what long-term effects it will have on the dam structure. The EIS should explain plans for treatment and discharge of the sanitary wastes generated by use of the new recreation site.

Response:

The proposed impoundment's relation to ground water has been added in the statement on page 23, paragraph 4.

The sewage from the recreation development will be piped to the sewage treatment plant at Canby. This was provided for in the draft environmental impact statement and is now on page 26, paragraph 7 of the final statement.

Comment:

Probable Environmental Impacts

The EIS indicated that upland sheet erosion on 8,100 acres of untreated land in the watershed is occurring at the rate of 13 tons per acre per year. This is a significant impact and, therefore, the EIS should provide more information about the impact and erosion abatement measures. How does the existing erosion compare to the allowable soil loss tolerance for the project area? The draft EIS estimates that land treatment measures will increase the adequately treated cropland (soil loss less than 4 tons per acre per year) from 1,250 to 6,250 acres and that the remaining 3,100 acres will continue to lose



soil at an average of 13 to 11 tons per acre per year. When will this amount of land treatment be achieved and to what extent will it be achieved prior to construction of the impoundments? What will the interim effects of sedimentation in the proposed impoundments be if land treatment is not achieved to the extent estimated? The draft EIS states that the conservation land treatment will reduce the sediment yield by 50 percent. If this reduction is not realized, significant sediment accumulation could occur in the proposed impoundments. Therefore, the EIS should explain how this determination was made and the data on which it was based.

Response:

Fifty percent of the land upstream of the impoundments will be adequately treated and have conservation plans prior to construction of the structural measures. See page 22, paragraph 5.

The sediment requirements for the reservoirs were calculated on the basis that it would take seven years to obtain the total land treatment requirements as planned.

The erosion on the watershed was calculated using the Universal Soil Loss Equation. Field data was obtained in the field on land use, cover conditions, soils, slopes, etc. This data was used in calculating the soil loss for the fields to obtain the erosion rates.

Comment:

The EIS should discuss potential impacts of sediment load reassimilation downstream from structure R-6. There will be approximately 150 feet of fall between structures R-1 and R-6 over a distance of 4.5 stream miles and as the relatively silt-free waters move out of structure R-6, considerable channel erosion could develop.

Response:

The EIS has been enlarged with a discussion of the possible effects the release of de-silted waters from structure R-6 may have on channel erosion down to structure R-1. The effects of the de-silted water releases were considered to be negligible on the stream reach between sites R-6 and R-1. The addition to the EIS was placed in section 2, Environmental Impact under Structural Measures on page 34, paragraph 2.

Comment:

More information is needed in the EIS to evaluate the proposed alternatives. The geologic characteristics of the preferred sites should be discussed to explain why they are the most suitable. The EIS should explain if other locations were considered and why they were eliminated.



Response:

Geologic characteristics were not major factors in selection of preferred sites. The controlling considerations were the necessary storage requirements for flood prevention to the city of Canby and structure costs. Costs are influenced more by physical characteristics, such as length and height of dams, in this project area than by geologic characteristics.

Comment:

If it should be established that existing water quality standards for Canby Creek will not be maintained, the Alternatives Section of the EIS should be expanded to present viable alternatives to the project and should describe and compare the respective water quality impacts for each alternative. For example, the alternative of a single-purpose flood-prevention structure and land treatment should be discussed more extensively.

Response:

It is anticipated that water quality of Canby Creek will be improved, not degraded. The sediment trap efficiency of the proposed floodwater-retarding structures is about 90 percent. The water quality monitoring program, as presented on page 28 of the impact statement, will verify these assumptions. If this assumption is not verified, structure design can be modified through mutual agreement between the following parties:

Local Sponsors, Minnesota Department of Natural Resources, Minnesota Pollution Control Agency, U.S. Environmental Protection Agency, and the Soil Conservation Service.

Comment:

Other Comments

In a field review discussion, it was stated that the project would commence in 3 years (1977) and take 7 years to complete. These dates should be incorporated into the final EIS.

Response:

These dates were given as an estimate. Starting time and completion dates are dependent upon environmental impact statement review time needs, Congressional appropriation of funds, and many other factors. Therefore, these dates should not be incorporated.

Comment:

The EIS should identify where spoil from the proposed channelization will be disposed. The type of development that is expected to occur around the R-1 and R-4A structures and the resulting long-term environmental effects should be explained in the EIS.

Response:

The spoil placement is explained in the last paragraph under Stream Channel Stabilization on page 27, last paragraph.

The potential land use changes expected to occur around structures R-1 and R-4A are described in Environmental Impact section on pages 32, 33, and 34, and page 38, last paragraph.

Comment:

We concur with the Canby City Council in enacting an ordinance to restrict future development of the flood plain. We recommend that such an ordinance be implemented prior to construction of the proposed project. However, we question the compatibility of restrictive zoning with the intention of city officials to expand east of the city in the area now subject to frequent flooding (page 10). The EIS should address the above contradiction.

Response:

This contradiction has been clarified on page 11, paragraphs 2, 3 and 4.

5. Upper Mississippi River Basin Commission

Comment:

We have no comment on the statement.

Response:

No response required.

6. Governor of Minnesota

Received letter of general concurrence on the watershed work plan and draft environmental statement. Since no environmental issues were raised, there is no further discussion.

7. State Planning Agency

Received letter showing compliance with the procedure established by Office of Management and Budget Circular A-95. Since no environmental issues were raised, there is no further discussion.

8. Department of Natural Resources

Comment:

Page 6 - We realize that data on concentrations of phosphate, nitrate, ammonia nitrogen, and total alkalinity are currently not available, but such data should be included in Table IV, if possible. In addition, water quality data should also include some reference to coliform bacteria concentrations and Biochemical Oxygen Demand (BOD).

Response:

A water quality monitoring proposal is presented in the narrative portion of the environmental impact statement on page 28, paragraphs 3 and 4.

Comment:

Page 10 - Paragraph 2 indicates a tendency to develop areas in Canby which are flood-prone. Unrestricted development of flood-prone areas is discouraged by both Federal and State agencies. This development should be reviewed in conjunction with Canby's enrollment in the Federal Flood Insurance Program which will ultimately require flood plain zoning.

Response:

This contradiction has been clarified on page 11, paragraphs 2, 3, and 4.

Comment:

Page 20 - The listing of drainage ditches as an accepted conservation practice without sufficient explanation is misleading. Perhaps calling them an "accepted agricultural practice" would be more appropriate.

Response:

The description of a drainage ditch has been modified to be an accepted agricultural practice. See page 21, definition of drainage field ditch.



Comment:

Pages 22 and 23 - It is impossible to determine from either the work plan or environmental statement if structure R-6 will be a barrier to upstream movement of fish. The Department of Natural Resources plans to "rehabilitate" trout waters upstream from R-6. Accordingly, if R-6 is a barrier to fish, management of trout fishery upstream could be enhanced.

Response:

The principal spillway on R-6 is planned as a fish barrier. See Planned Action Section, page 24, paragraph 6.

Comment:

Page 29 - Paragraph 5 estimates recreational use of the R-1 reservoir at 47,800 visitor days annually. This estimate should be separated into the various usages, i.e., swimming, camping, picnicking, fishing, etc.

We believe this estimate to be high, based on earlier computation by the Inter-Agency Biology Review Team. Neither the work plan or environmental statement acknowledge the presence of nearby recreational areas such as Lake Hendricks, Lac qui Parle, Bigstone Lake, and Lake Cochrane, all of which are extensively used for outdoor recreation.

Response:

The water-based recreation development will provide a total of 47,800 recreation visits annually including:

Boating	4,230
Fishing	3,000
Picnicking	18,800
Camping	5,950
Swimming	12,100
Off-season use	3,720
	<hr/>
	47,800

The earlier recreational usage computation was based on a 77-day season for all activities plus the off-season use of the facilities. A subsequent estimate was based on a 120-day season for boating, fishing, and picnicking, and a 77-day season for camping and swimming plus the off-season use.

Evaluations on the opportunity demand for recreational areas by the estimated 1990 population indicated a potential demand for

facilities providing an additional 100,000 annual recreational visits. The nearby recreational areas of Lake Hendricks, Clear Lake, Big Stone Lake, Lac qui Parle Reservoir, Camden State Park, and the city of Marshall were considered in the evaluation. The facilities included in this plan will provide about half of the potential demand for recreational activities.

9. Minnesota Association of Soil and Water Conservation Districts

Comment:

Received letter of general concurrence.

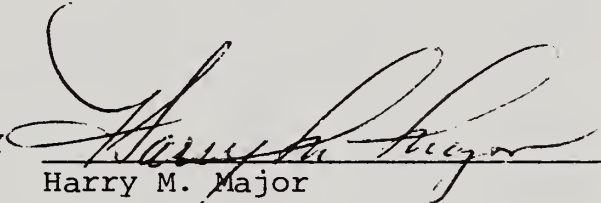
Response:

Since no environmental issues were raised, there is no further discussion.

9. LIST OF APPENDIXES

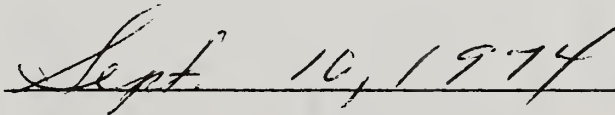
- Appendix A - Comparison of Benefits and Costs of Structural Measures
- Appendix B - Letters and Comments Received on the Draft Environmental Statement
- Appendix C - Project Map
- Appendix D - Wetlands Inventory Map
- Appendix E - Structural Area Land Use - Structure R-1
- Appendix F - Structural Area Land Use - Structure R-6
- Appendix G - Structural Area Land Use - Structure R-4A
- Appendix H - Applicable State Water Quality Criteria for Canby Creek.

APPROVED BY

  
Harry M. Major

State Conservationist

DATE







# APPENDIX A - COMPARISON OF BENEFITS AND COST FOR STRUCTURAL MEASURES

Canby Creek Watershed, Minnesota

(Dollars)

Evaluation Unit	AVERAGE ANNUAL BENEFITS <sup>1/</sup>					Total Benefits	Average Annual Cost	Benefit Cost Ratio
	Damage Reduction	More Intensive Land Use	Urban Area Enhance.	Recreation	Secondary			
Floodwater Retarding Structure R-4A	12,100	570			1,210	13,880	7,830	1.8:1
Floodwater Retarding Structure R-6, Multiple Purpose Structure R-1, Recreation Facilities, Stream Channel Stabilization and Grade Stab. Strs.	37,900	5,680	3,170	71,700	14,170	132,620	104,490	1.3:1
Project Adminis.							11,240	
GRAND TOTAL	<u>2/</u> 50,000	6,250	3,170	71,700	15,380	146,500	123,560	1.2:1

3/

1/ Price Base - Adjusted Normalized.

2/ In addition, land treatment measures are estimated to provide flood damage reduction benefits of \$2,670 annually.

3/ Based upon 5-3/8% discount rate applicable when the plan was developed. The benefit-cost ratio is 1.2:1.0 based upon the discount rate of 5-7/8% 1974 price levels for construction.

December 1971





DEPARTMENT OF THE ARMY

WASHINGTON, D.C. 20310

2 APR 1974

Honorable Robert W. Long  
Assistant Secretary of Agriculture  
Washington, D. C. 20250

Dear Mr. Long:

In compliance with the provisions of Section 5 of Public Law 566, 83rd Congress, the Administrator of the Soil Conservation Service, by letter dated 8 January 1974, requested the views of the Secretary of the Army on the Watershed Work Plan and Draft Environmental Statement for the Canby Creek Watershed, Minnesota.

We have reviewed the work plan and foresee no conflict with any projects or current proposals of this Department. In view of the proximity of the proposed project to Canby, and considering possible loss of life or damage should the structure fail, it is suggested that the emergency spillway be reevaluated during final design. The draft environmental statement is considered to be satisfactory.

Sincerely,

A handwritten signature in cursive script, reading "Charles R. Ford", is positioned above the typed name.

Charles R. Ford  
Chief  
Office of Civil Functions







# United States Department of the Interior

OFFICE OF THE SECRETARY  
WASHINGTON, D.C. 20240

ER-74/61

APR 10 1974

Dear Mr. Grant:

Thank you for the letter of January 8, 1974, requesting our views and comments on a work plan and draft environmental statement for the Canby Creek Watershed, Lincoln and Yellow Medicine Counties, Minnesota.

The watershed work plan adequately reflects the views of the Bureau of Sport Fisheries & Wildlife relative to the structural aspects of the proposal. However, the work plan does not include sufficient measures to insure protection of the fish and wildlife resources from the non-structural measures (land treatment) which are to be implemented. Of particular concern is the possibility that implementation of the land treatment measures could result in drainage of wetlands located in the southwestern part of the watershed. These wetlands are used for nesting and feeding purposes by various species of migratory waterfowl which are afforded international protection by the Migratory Bird Treaty Act of 1918, as amended, 16USC701-711.

The second complete paragraph on page 14 indicates that certain wildlife wetland habitat management practices will be used. A thorough coverage of the planned practices should be set forth in the report covering such things as what practices are intended, how the areas will be treated and how much land will be affected. Numerous references are made to plantings that will be beneficial to wildlife in the report but these plantings must be identified as to type and quantity if the reviewers are to be able to assess the effects of this planting effort. Further, information as to who will be committed to do the planting, who is to fund the work and when is needed to demonstrate that the program will become a reality rather than a desirable but optional proposal.



# THE HISTORY OF THE UNITED STATES

BY  
JAMES M. SMITH

1888

THE HISTORY OF THE UNITED STATES  
BY  
JAMES M. SMITH  
PUBLISHED BY  
THE AMERICAN BOOK CONCERN  
NEW YORK  
1888



We believe the evaluation of the impact of the proposed action on the hydrologic environment is accurate and sufficiently complete. We can see no significant deleterious effects on the hydrology of the area as a result of the proposed project; in fact, many benefits would accrue.

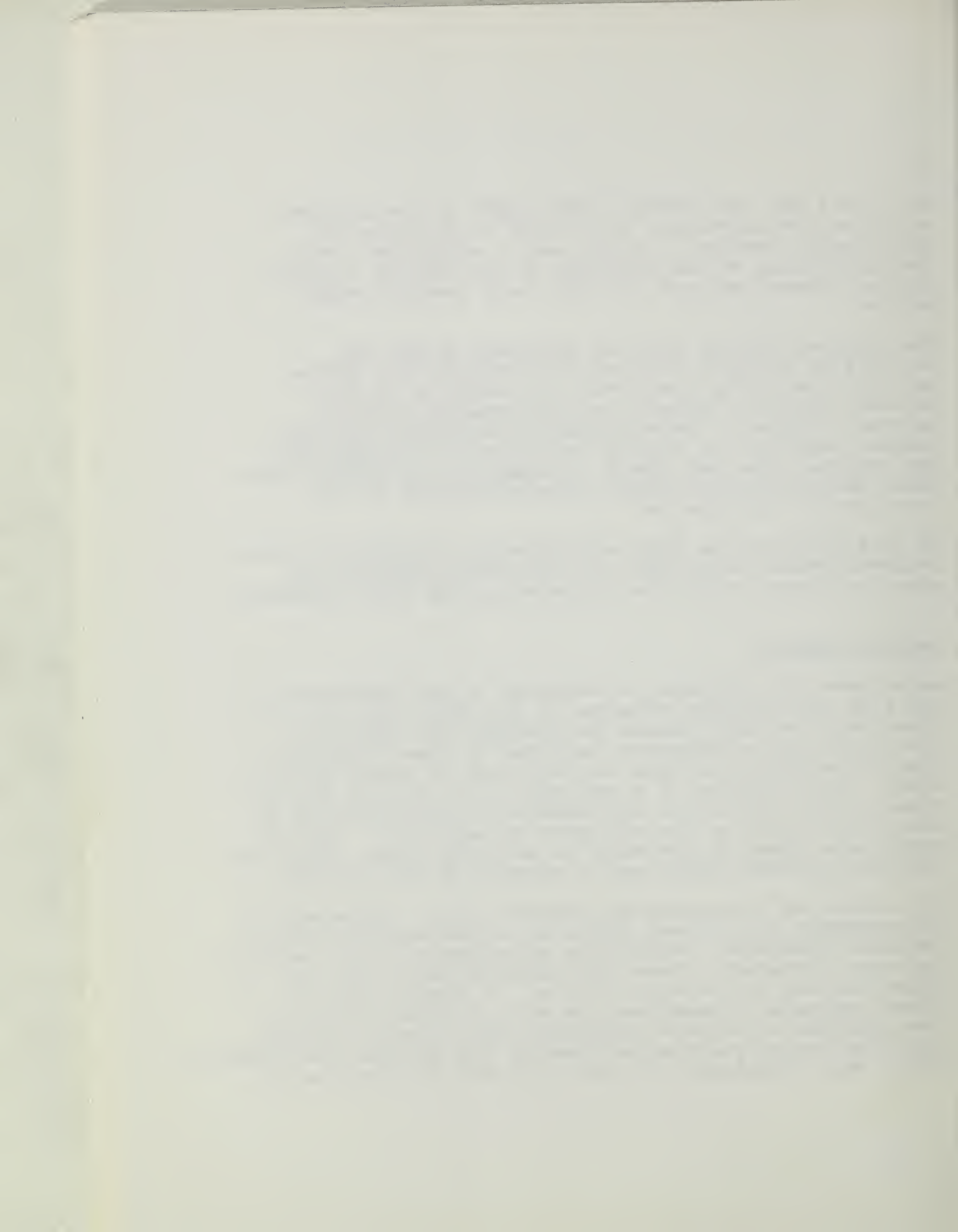
The proposed project will not adversely affect any existing or proposed units of the National Park System nor any sites being considered for inclusion in the National Historic, Natural or Environmental Education Landmark Programs. No substantial involvement with the mineral resources or related industries is contemplated. The proposal does not appear to impact on any Indian lands which would affect the trust responsibilities of the Secretary of the Interior.

We have reviewed the draft environmental statement for the proposed project and submit the following comments for your consideration and use in preparing the final statement.

#### General Comments

We believe the statement is deficient in its discussion on the fish and wildlife resources of the study area and in those sections which assess and identify the impacts of structural and nonstructural measures on these resources. Fish and wildlife habitats are described in rather general terms. The inclusion of a map which shows present habitat types in the vicinity of the structural measures would improve this aspect of the statement presentation. The map should also show the locations of wetlands lying within the watershed boundary which may be affected by the proposal.

We believe the environmental statement to be inadequate in its attention to cultural (historic, archeological, architectural) resources. Aside from consultation of the National Register of Historic Places and correspondence with the State Historic Preservation Officer, it appears that no effort was made to undertake the sort of interdisciplinary investigation of cultural resources and of project effects upon them during planning required by the National Environmental Policy Act. The extent to which cultural resources may be



adversely affected by the project, then, is undetermined. Accordingly, we maintain that an investigation of the affected area must be undertaken by persons professionally trained to locate, identify, and evaluate historic, archeological, and architectural resources. The results of the survey should be sufficient to provide a substantive description of affected cultural resources, an assessment of the effects of the project upon them, and a program of measures that will be instituted to avoid or mitigate adverse effects to the extent possible. A large part of this effort may take the form of an archeological survey and salvage program prior to construction. We also note that even in the case of the one cultural resource identified through correspondence, the statement is silent concerning the relation of that site to the project. The statement should describe the project effects on the site, and if it will be adversely affected, describe what measures will be taken to mitigate the problem through avoidance or other protection, or through salvage excavation to recover data and materials should adverse effects be unavoidable.

Environmental impacts related to geologic conditions appear to have been adequately considered in the draft environmental statement and work plan.

The draft statement has used information from U.S. Geological Survey Hydrologic Atlas 269, Water Resources of the Lac Qui Parle River Watershed, and it has been properly referenced.

The draft statement includes a descriptive section, "Environmental Setting," that deals in part with the physiography and soils of the area. It also makes brief mention (page 3, paragraph 9) of sand and gravel resources in the project area. The size and location of such deposits are not discussed. Both the plan and the statement mention sand and gravel deposits along Canby Creek for which mineral rights are to be obtained. The description and size of these deposits, and any others affected by the project, should be included in the environmental statement. Acquisition of mineral rights involves the irreversible commitment of these natural resources for the life of the project. In the area of acquisition of mineral rights, the Departments of the Army and Interior have a long-standing agreement that mineral rights at reservoir sites will be acquired only when necessary for the primary purpose of the





project and for public access. In other lands in the project area, mineral rights would be subordinated to the project purpose. Discussion of these gravel deposits, plus mention of construction minerals committed to the structural measures should be included in section 7, Irreversible and Irretrievable Commitments of Resources.

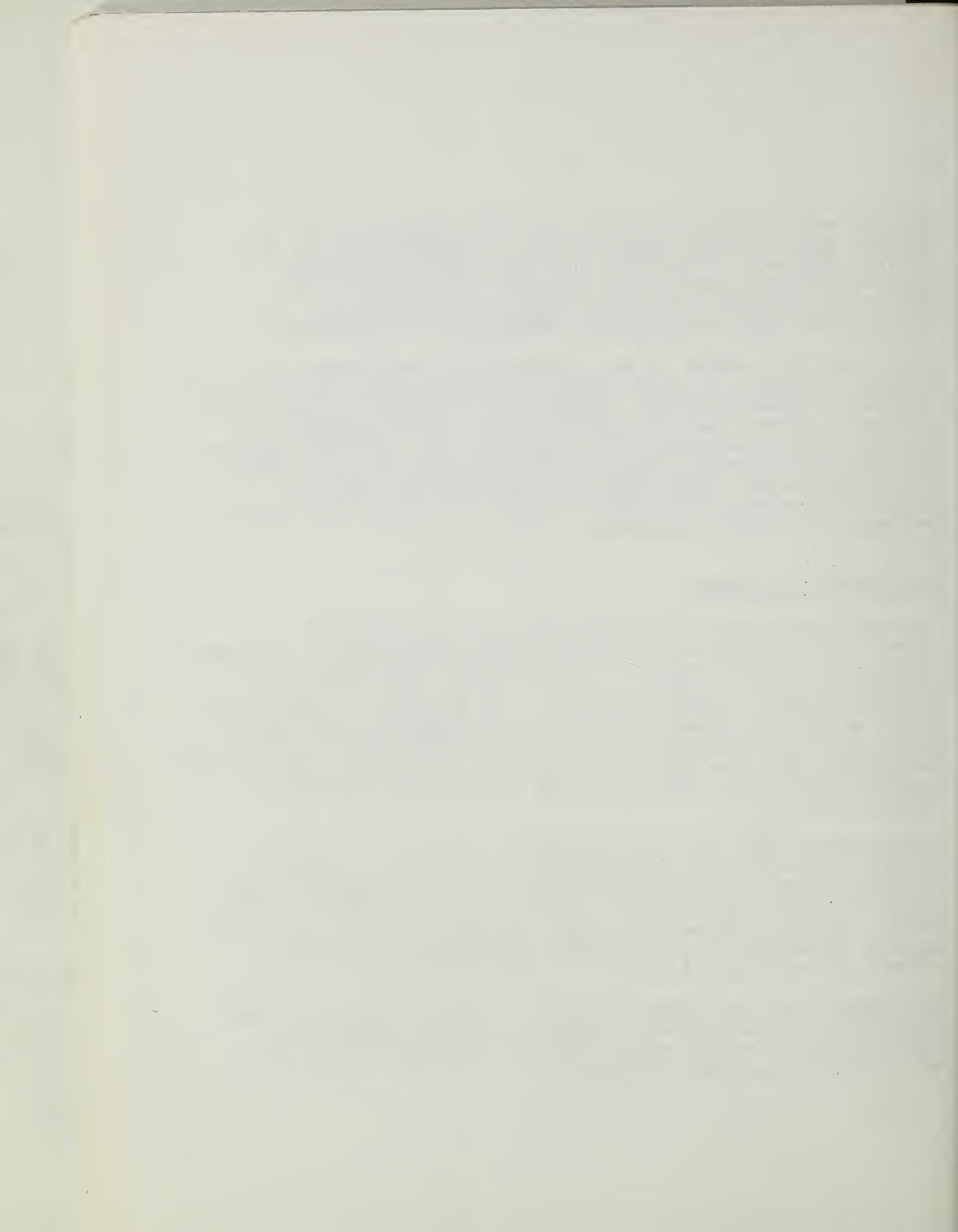
There does not appear to be a substantial involvement of mineral resources in this project, but the draft environmental statement should contain enough data to support such a conclusion. We recommend the addition of a few paragraphs in the descriptive section and in section 7 to cover the geology and both the existing and potential mineral deposits within the project area. Such data will provide the input to assess adequately the project's impact on present and future recovery of mineral resources.

### Environmental Impacts

One area which has a real potential for environmental impact is the nonstructural features of the project. Although some land treatment measures carry obvious beneficial environmental impacts, others, such as tilling and ditching adversely affect wildlife habitat. Of particular significance would be land treatment effects on the numerous small wetlands found in the upper section of the watershed. Wildlife management practices that will be used on the additional habitat planned for the study area should also be detailed in this section.

We recommend that the final statement quantify the acres of wildlife habitat to be created or improved as a result of the proposed land treatment measures. For example, page 28 mentions only 50 acres of land are to be managed for wildlife. It would appear that land treatment measures, when applied throughout the watershed, would have beneficial effects on more than 50 acres of wildlife habitat.

We suggest that the final statement contain a more detailed discussion of the project's impact on natural habitat of both streamside wooded areas and stream channel should be set forth in the final statement.





The proposed recreational impoundment for the multipurpose reservoir would raise groundwater levels in the immediate area above the dam but we do not believe this would have an adverse impact. Secondary effects would probably result from utilization of the reservoir; but in this area, adequate safeguards are proposed to retain a healthy hydrologic environment.

### Irreversible and Irretrievable Commitment of Resources

This section should contain a detailed discussion of the fish and wildlife resources that will be lost or degraded by each of the structural measures listed in the table on page 34. This section should also make it clear that the losses identified are of a permanent nature.

In summary, the Department of the Interior makes the following recommendations with respect to this watershed work plan.

1. The preservation of the wetlands located in the southwestern part of the watershed should be maintained when land treatment measures are implemented.
2. Wildlife wetland habitat management practices should be implemented in the study area.
3. The enclosed report of the Bureau of Sport Fisheries and Wildlife accompany the work plan when it is forwarded to the Congress.

Sincerely yours,

*Rayston C. Hughes*  
 Assistant  
 Secretary of the Interior

Mr. Kenneth E. Grant  
 Administrator  
 U.S. Department Of Agriculture  
 Soil Conservation Service  
 Washington, D. C. 20250

Enclosure





DEPARTMENT OF TRANSPORTATION  
UNITED STATES COAST GUARD

MAILING ADDRESS:  
U.S. COAST GUARD (G-WS/73)  
400 SEVENTH STREET SW.  
WASHINGTON, D.C. 20500  
PHONE: (202) 426-2262

5 MAR 1974

Mr. Kenneth E. Grant  
Administrator  
Soil Conservation Service  
Department of Agriculture  
Washington, D. C. 20250

Dear Mr. Grant:

This is in response to your letter of 8 January 1974 addressed to Admiral Bender concerning a draft environmental impact statement for the watershed work plan for the Canby Creek Watershed, Lincoln and Yellow Medicine Counties, Minnesota.

The Department of Transportation has reviewed the draft statement. We have no comments to offer nor do we have any objection to the statement.

The opportunity to review this draft environmental impact statement is appreciated.

Sincerely,

R. I. PRICE  
Captain, U. S. Coast Guard  
Deputy Chief, Office of Marine  
Pollution Prevention Systems  
By Direction of the Commandant







UNITED STATES  
ENVIRONMENTAL PROTECTION AGENCY  
REGION V  
1 NORTH WACKER DRIVE  
CHICAGO, ILLINOIS 60606

Mr. Kenneth E. Grant  
Administrator  
United States Department  
of Agriculture  
Soil Conservation Service  
Washington, D. C. 20250

MAR 29 1974

Dear Mr. Grant:

In response to your letter of January 8, 1974, we have reviewed the Draft Environmental Impact Statement (EIS) for the Canby Creek Watershed Project, Lincoln and Yellow Medicine Counties, Minnesota. We have classified our comments as Category LO-2. Specifically, this means we have made a preliminary determination on the impact of the project as described in the EIS and have no objections. However, we believe the EIS should provide more information in order to fully assess the water quality impact of the project. In particular, the EIS should establish if applicable water quality criteria for Canby Creek are expected to be met so as to maintain its present State classification. The classification and date of our comments will be published in the Federal Register in accordance with our responsibility to inform the public of our views on Federal actions under Section 309 of the Clean Air Act. The following comments are for your use in preparing the Final EIS.

Environmental Setting

The weather data provided should be expanded to indicate minimums and maximums for annual rainfall as well as amounts of rainfall experienced in 5, 7, and 100-year frequency floods. The EIS indicated that portions of the watershed are subject to wind erosion. Data on the direction and velocity of prevailing winds should be provided to make it possible to evaluate the seriousness of this hazard with respect to the proposed project.

Water Quality

The EIS should address the effects that flooding crop and pastureland behind floodwater retarding structures could cause on downstream waters. Excessive nutrients could create undesirable algal growths in the impoundments and downstream. Water quality data for Canby Creek should be determined for levels of total coliform, fecal coliform, phosphates, nitrates, pesticides and biological oxygen demand. The segment of Canby Creek on which the proposed project would be constructed is a trout stream and presently classified as 2A (Classification of Interstate Waters of Minnesota, WPC 25, MPCA). The EIS should present the applicable State water quality criteria (WPC 15) for the above classification

THE HISTORY OF THE  
CITY OF BOSTON  
FROM 1630 TO 1800

1630-1800

THE HISTORY OF THE  
CITY OF BOSTON  
FROM 1630 TO 1800

The history of the city of Boston from 1630 to 1800 is a story of growth and change. It begins with the arrival of the first settlers in 1630, who founded the city as a haven for Puritans seeking religious freedom. Over the years, Boston grew from a small village into a major center of commerce and industry. The city played a key role in the American Revolution, and its history is marked by significant events such as the Boston Tea Party and the Battle of Bunker Hill. By 1800, Boston had become one of the most important cities in the young nation.

The city's growth was fueled by its strategic location on the coast, which made it a major port for trade. Boston's economy was based on shipping, commerce, and industry, and it became a center of innovation and progress. The city's population grew rapidly, and it became known for its education, culture, and political influence. By the end of the 18th century, Boston was a city of great importance and power.

The history of Boston is a testament to the city's resilience and ability to adapt to change. It is a story of a city that has shaped the course of American history and continues to play a vital role in the nation's future. The city's rich heritage and diverse population make it a unique and important part of the American landscape.



and should provide data to substantiate that existing water quality for Canby Creek will not be degraded.

We encourage implementation of the following measures to maintain a viable trout stream upstream of the R-6 impoundment and between the R-6 and R-1 impoundments: plans for a drop structure to prevent warm water species from migrating upstream to the trout area; restriction of cattle grazing in the immediate area of the stream. Also, we concur with plans for a cold water release from R-6, but believe the EIS should address the potential impact on downstream water quality of discharging bottom (hypolimnion) waters which may be low in oxygen and high in degrading nutrients and pollutants.

The EIS should discuss the proposed impoundments in relation to the region's water table. If seepage is expected to occur, a brief description should be included of how it will be controlled and what long-term effects it will have on the dam structure. The EIS should explain plans for treatment and discharge of the sanitary wastes generated by use of the new recreation site.

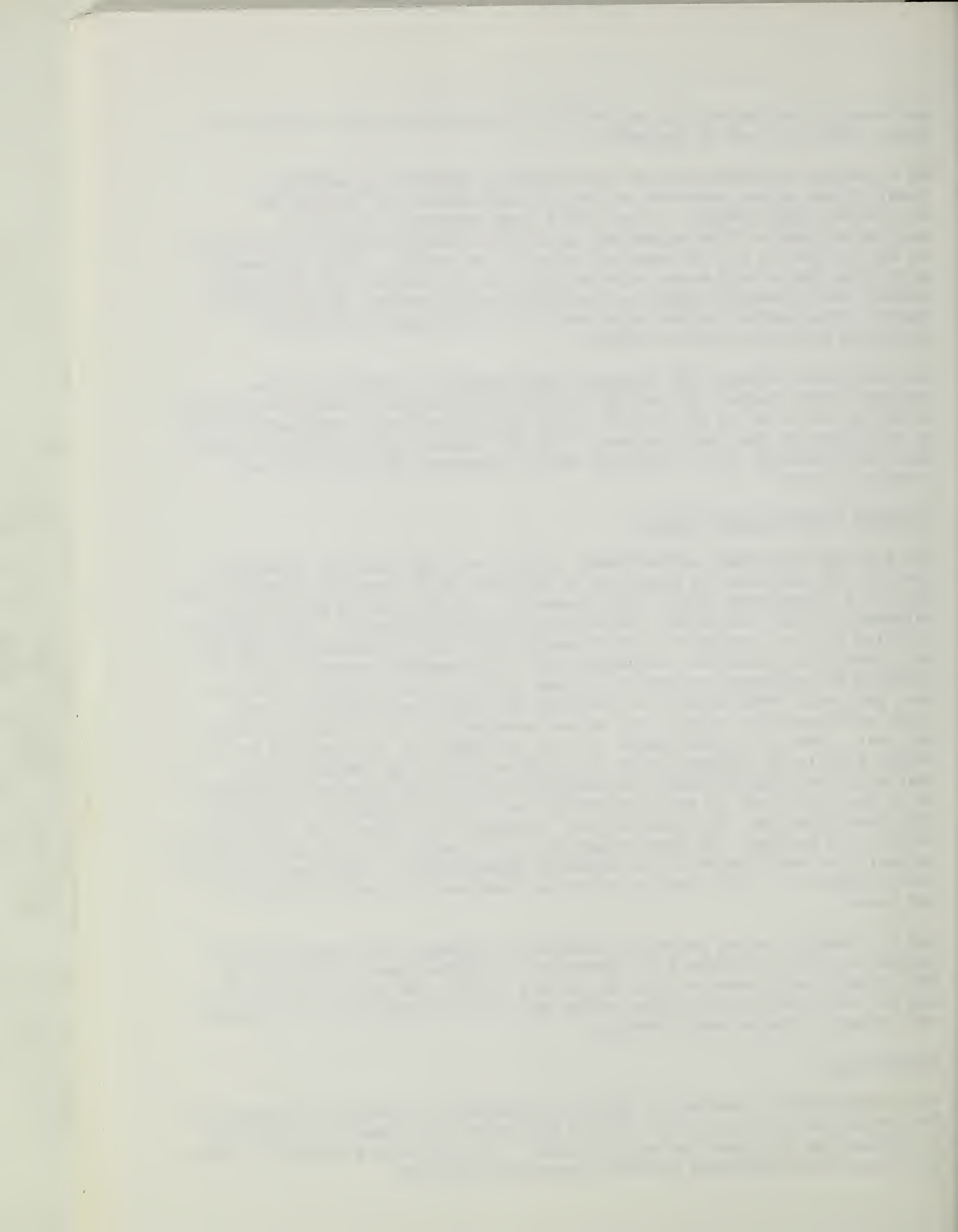
#### Probable Environmental Impacts

The EIS indicated that upland sheet erosion on 8,100 acres of untreated land in the watershed is occurring at the rate of 13 tons per acre per year. This is a significant impact and, therefore, the EIS should provide more information about the impact and erosion abatement measures. How does the existing erosion compare to the allowable soil loss tolerance for the project area? The draft EIS estimates that land treatment measures will increase the adequately treated cropland (soil loss less than 4 tons per acre per year) from 1,250 to 6,250 acres and that the remaining 3,100 acres will continue to lose soil at an average of 13 to 11 tons per acre per year. When will this amount of land treatment be achieved and to what extent will it be achieved prior to construction of the impoundments? What will the interim effects of sedimentation in the proposed impoundments be if land treatment is not achieved to the extent estimated? The draft EIS states that the conservation land treatment will reduce the sediment yield by 50 percent. If this reduction is not realized, significant sediment accumulation could occur in the proposed impoundments. Therefore, the EIS should explain how this determination was made and the data on which it was based.

The EIS should discuss potential impacts of sediment load reassimilation downstream from structure R-6. There will be approximately 150 feet of fall between structures R-1 and R-6 over a distance of 4.5 stream miles and as the relatively silt-free waters move out of structure R-6 considerable channel erosion could develop.

#### Alternatives

More information is needed in the EIS to evaluate the proposed alternatives. The geological characteristics of the preferred sites should be discussed to explain why they are the most suitable. The EIS should explain if other locations were considered and why they were eliminated.



If it should be established that existing water quality standards for Canby Creek will not be maintained, the Alternatives Section of the EIS should be expanded to present viable alternatives to the project and should describe and compare the respective water quality impacts for each alternative. For example, the alternative of a single purpose flood prevention structure and land treatment should be discussed more extensively.

#### Other Comments

In a field review discussion it was stated that the project would commence in three years (1977) and take seven years to complete. These dates should be incorporated into the final EIS.

The EIS should identify where spoil from the proposed channelization will be disposed. The type of development that is expected to occur around the R-1 and R-4a structures and the resulting long-term environmental effects should be explained in the EIS.

We concur with the Canby City Council in enacting an ordinance to restrict future development of the flood plain. We recommend that such an ordinance be implemented prior to construction of the proposed project. However, we question the compatibility of restrictive zoning with the intention of City officials to expand east of the city in the area now subject to frequent flooding (page 10). The EIS should address the above contradiction.

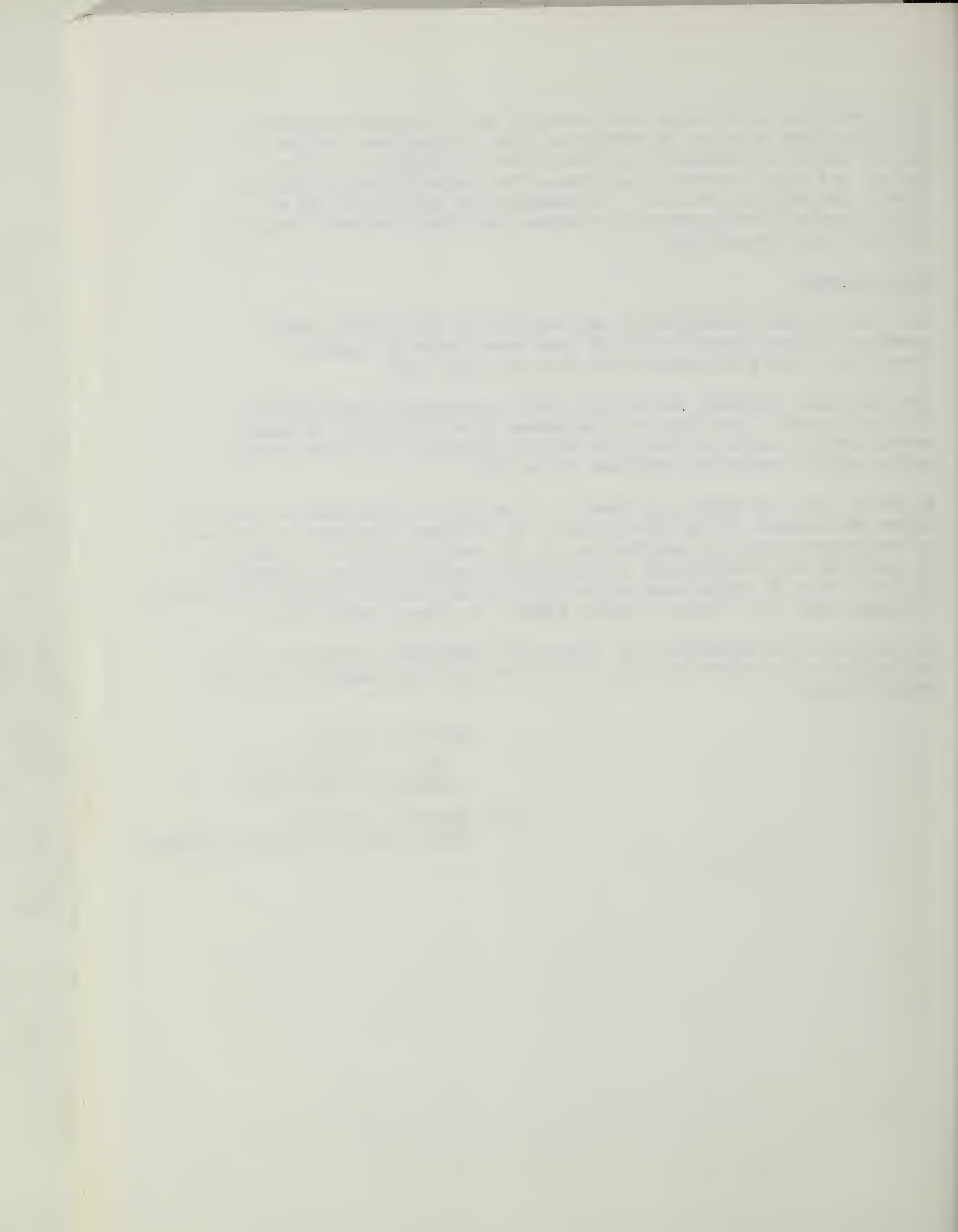
We appreciate the opportunity to review this Draft EIS. Please send us two copies of the final EIS when it is filed with the Council on Environmental Quality.

Sincerely yours,



for Donald A. Wallgren  
Chief, Federal Activities Branch







## UPPER MISSISSIPPI RIVER BASIN COMMISSION

FEDERAL BUILDING, ROOM 510, FORT SNELLING, TWIN CITIES, MINNESOTA 55111, PHONE: 612-725-4690  
REG. OFFICE, ROOM 238 FEDERAL BLDG. COURTHOUSE, FARGO, N.D. 58102, PHONE: 701-237-5771 EXT. 5355

February 15, 1974

Mr. Harry M. Major  
State Conservationist  
Department of Agriculture  
316 North Robert Street  
St. Paul, Minnesota 55101

Dear Mr. Major:

The Draft Environmental Impact Statement of your Work Plan for the Canby Creek Watershed has been received and filed by this office.

At present, the Upper Mississippi River Basin Commission has not established a review procedure for such documents. Therefore, at this time, we have no comments on the Statement.

The material you provided does contain useful information for the Commission, and we request you continue to send us information and copies of similar material for our future use and consideration.

Thank you for the opportunity to comment.

Sincerely Yours,

George W. Gribenow  
Chairman

GWG:dm



THE UNIVERSITY OF CHICAGO

CHICAGO, ILLINOIS

OFFICE OF THE  
VICE CHANCELLOR  
FOR RESEARCH  
AND  
INNOVATION

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CHICAGO, ILLINOIS

2024





# STATE OF MINNESOTA

OFFICE OF THE GOVERNOR

ST. PAUL 55155

WENDELL R. ANDERSON  
GOVERNOR

May 3, 1974

Mr. Kenneth E. Grant, Administrator  
United States Department of Agriculture  
Soil Conservation Service  
Washington, D. C.

Dear Mr. Grant:

We have received the Watershed Work Plan and draft environmental statement for the Canby Creek Watershed, Lincoln and Yellow Medicine Counties. We concur with the work plan, and believe that project proposals will provide flood protection, and create needed recreational opportunities while preserving and enhancing the natural resources of the watershed.

We recommend that the environmental statement be finalized, and that this project be approved for operation.

With warmest personal regards.

Sincerely,

*Wendell R. Anderson*

Wendell R. Anderson

WRA/aj

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# STATE OF MINNESOTA

STATE PLANNING AGENCY  
100 CAPITOL SQUARE BUILDING  
550 CEDAR STREET  
ST. PAUL, 55101

March 5, 1974

Mr. Harry M. Major  
State Conservationist  
Soil Conservation Service  
200 Federal Building  
316 North Robert Street  
St. Paul, Minnesota

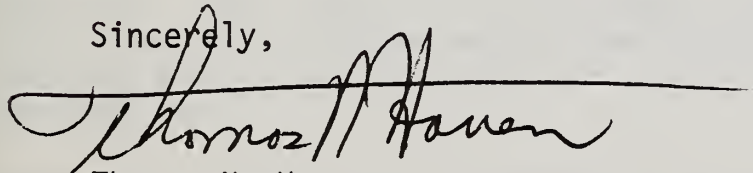
RE: Draft Environmental Impact Statement and Work Plan for the  
Canby Creeks Wastershed, Lincoln and Yellow Medicine County

Dear Mr. Major:

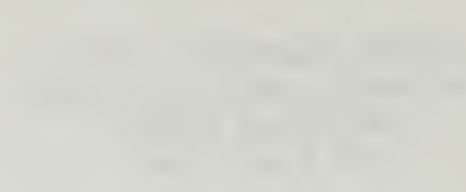
This is to certify that the Minnesota State Planning Agency has, in accordance with the procedures established by Office of Management and Budget Circular A-95, reviewed the above mentioned draft environmental impact statement and work plan. State agencies which may be interested or affected by the proposal have been notified.

This letter represents the final action of the State Planning Agency in its review of Canby Creek Watershed draft environmental statement and work plan.

Sincerely,

  
Thomas N. Harren





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CENTENNIAL OFFICE BUILDING • ST. PAUL, MINNESOTA • 55155

April 29, 1974

Mr. Harry M. Major  
State Conservationist  
Soil Conservationist Service  
316 North Robert Street  
St. Paul, Minnesota 55101

Re: Draft Environmental Impact Statement for  
Dear Mr. Major: the Canby Creek Watershed Project

The Department of Natural Resources has reviewed the draft Environmental Impact Statement and Watershed Work Plan of the Canby Creek Watershed, Lincoln and Yellow Medicine Counties.

We concur with the Watershed Work Plan. Accordingly, the following comments are directed toward the draft Environmental Statement.

Page 6 - We realize that data on concentrations of phosphate, nitrate, nitrite, ammonia nitrogen and total alkalinity are currently not available, but such data should be included in Table IV if possible. In addition, water quality data should also include some reference to coliform bacteria concentrations and Biochemical Oxygen Demand (BOD).

Page 10 - Paragraph two indicates a tendency to develop areas in Canby which are flood prone. Unrestricted development of flood prone areas is discouraged by both Federal and State Agencies. This development should be reviewed in conjunction with Canby's enrollment in the Federal Flood Insurance Program which will ultimately require flood plain zoning.

Page 20 - The listing of drainage ditches as an accepted conservation practice without sufficient explanation is misleading. Perhaps calling them an "accepted agricultural practice" would be more appropriate.

Pages 22 and 23 - It is impossible to determine from either the Work Plan or Environmental Statement if structure R-6 will be a barrier to upstream movement of fish. The Department of Natural Resources plans to "rehabilitate" trout waters upstream from R-6. Accordingly, if R-6 is a barrier to fish, management of the trout fishery upstream could be enhanced.

Page 29 - Paragraph five estimates recreational use of the R-1 reservoir at 47,800 visitor days annually. This estimate should be separated into the various usages, i.e., swimming, camping, picnicking, fishing, et cetera.



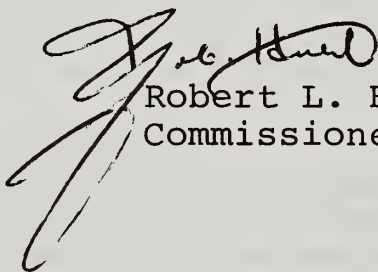


Harry M. Major  
April 29, 1974  
Page 2

We believe this estimate to be high, based on earlier computation by the Inter-Agency Biology Review Team. Neither the Work Plan or Environmental Statement acknowledge the presence of nearby recreational areas such as Lake Hendricks, Lac Qui Parle, Bigstone Lake and Lake Cochrane, all of which are extensively used for outdoor recreation.

We appreciate the opportunity to review the Work Plan and Environmental Statement, and look forward to continued close cooperation with the Soil Conservation Service during the operations stage of Canby Creek Watershed.

Sincerely,

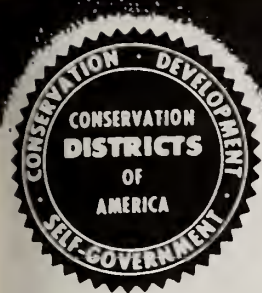


Robert L. Herbst  
Commissioner

H



# Minnesota ASSOCIATION OF SOIL & WATER CONSERVATION DISTRICTS



March 4, 1974

PRESIDENT  
LEONARD SKAAR  
R. 1, Thief River Falls, Minn. 56701  
Tel. 1-218-681-3601

VICE-PRESIDENT  
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Correll, Minn. 56227  
Tel. Correll-1-612-596-2216

SECRETARY-PROGRAM ADVISOR  
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St. Peter 1-507-931-3967

DIRECTORS  
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Immediate Past President  
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OFFICIO  
President  
Auxiliary  
PS. WALDEMAR GREWE  
R. 2, Gibbon, Minn. 55335  
1-507-834-6680

Mr. Harry M. Major; State Conservationist  
Soil Conservation Service  
200 Federal Building and U.S. Courthouse  
316 North Robert Street  
St. Paul, Minnesota 55105

Dear Mr. Major:

I have reviewed the Environmental Impact Statement and the Work Plan for the Canby Creek Watershed, Lincoln and Yellow Medicine County, Minnesota. Some of the favorable environmental effects of the project are the following:

1. Reducing erosion
2. Reducing sediment deposition in Lac Qui Parle Reservoir
3. Reducing flooding and floodwater damages
4. Improving upland game and waterfowl habitat
5. Provide a warm water fishery
6. Providing water based recreation activity

The adverse environmental effects are:

1. The increased duration of flooding and downstream low laying areas
2. Eliminating one mile of trout stream
3. Eliminating 690 acres from agriculture production
4. Increase noise and solid waste and air pollution

I believe the Canby Creek Watershed is a very worth while project and should be completed.

Sincerely,

*Leonard Skaar*

Leonard Skaar; President  
Minnesota Association of Soil & Water Districts





CONTENTS

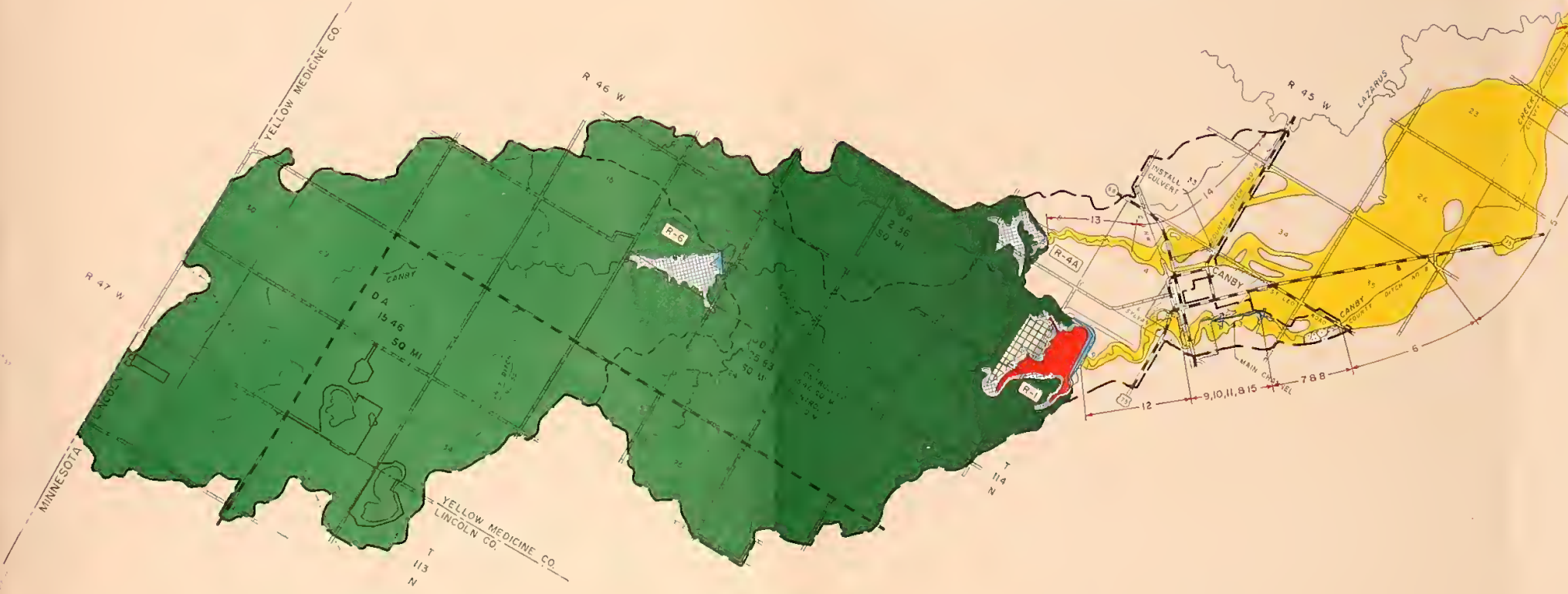
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REPORTS	1
EDITORIALS	1
DEPARTMENTS	1
SYMPOSIUM	1
CLINICAL REPORTS	1
BOOK REVIEWS	1
NOTES	1
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LEGEND

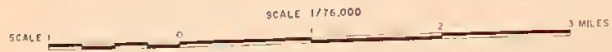
STATE LINE  
COUNTY LINE  
SECTION LINE  
SECTION NUMBER  
PAVED ROAD  
GRAVEL ROAD  
DIRT ROAD  
US NUMBERED HIGHWAY  
STATE NUMBERED HIGHWAY  
RAILROAD  
BRIDGE  
CEMETERY  
TOWN  
PERENNIAL STREAM  
INTERMITTENT STREAM  
LAKE  
PIPELINE  
WATERSHED BOUNDARY



SUB WATERSHED BOUNDARY  
FLDDOWATER RETARDING STRUCTURE  
MULTIPLE PURPOSE STRUCTURE  
GRADE STABILIZATION STRUCTURE  
STRUCTURE NUMBER  
DRAINAGE AREA IN SQUARE MILES  
EVALUATION REACH  
STREAM CHANNEL STABILIZATION  
DRAINAGE AREA CONTROLLED BY STRUCTURE  
AREA BENEFITED  
COMMON FLDDO PLAIN BENEFITED  
RECREATION DEVELOPMENT AREA  
STATE WILDLIFE MANAGEMENT AREA  
PORTION OF NATURAL CHANNEL  
MAINTENANCE AREA WHICH PROVIDES  
FDR GRAVEL MINERAL RIGHTS



PROJECT MAP  
CANBY CREEK WATERSHED  
LAC QUI PARLE, LINCOLN, AND  
YELLOW MEDICINE COUNTIES, MINNESOTA



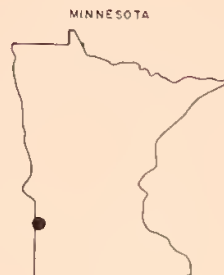




# WETLANDS INVENTORY MAP

## CANBY CREEK WATERSHED

### LINCOLN, AND YELLOW MEDICINE COUNTIES, MINNESOTA



#### LEGEND

STATE WILDLIFE MANAGEMENT AREA



WETLAND



TYPE OF WETLAND

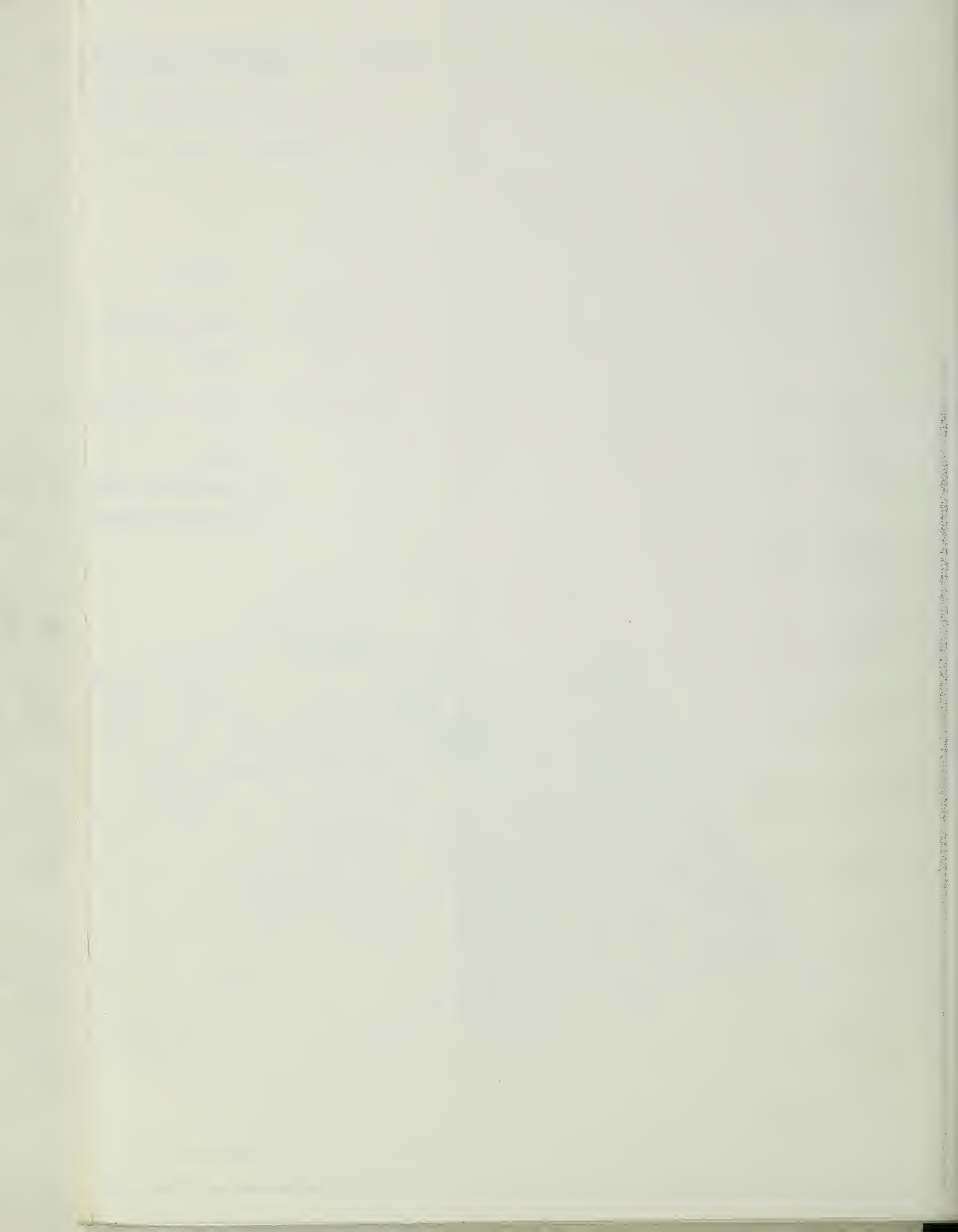
1, 2, 3, 4, 5, 6

#### NOTE:

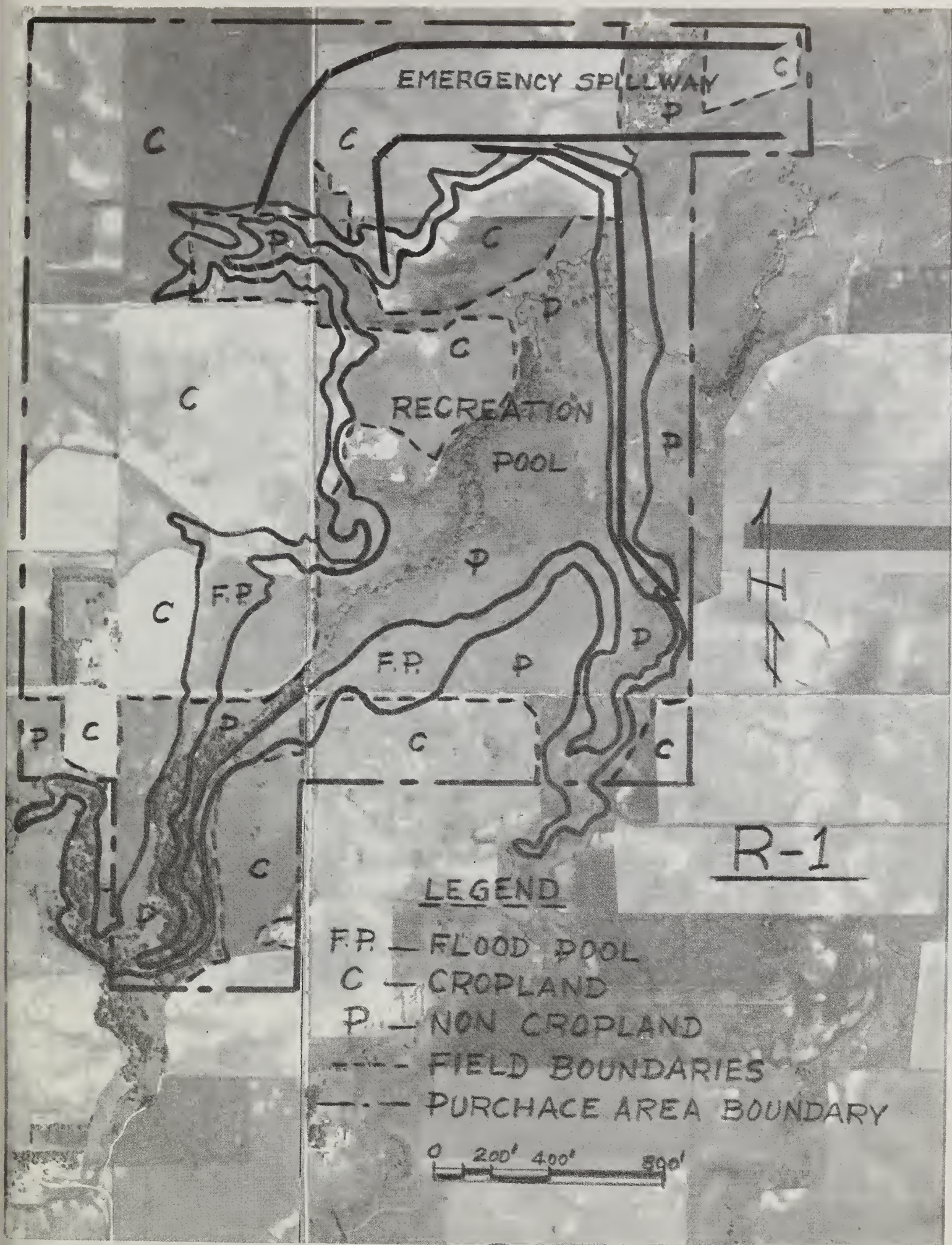
WETLANDS NORMALLY DESIGNATED IN  
ROMAN NUMERALS I, II, III, ETC.



SCALE 1 0 1 2 3 MILES  
SCALE 1:76,000









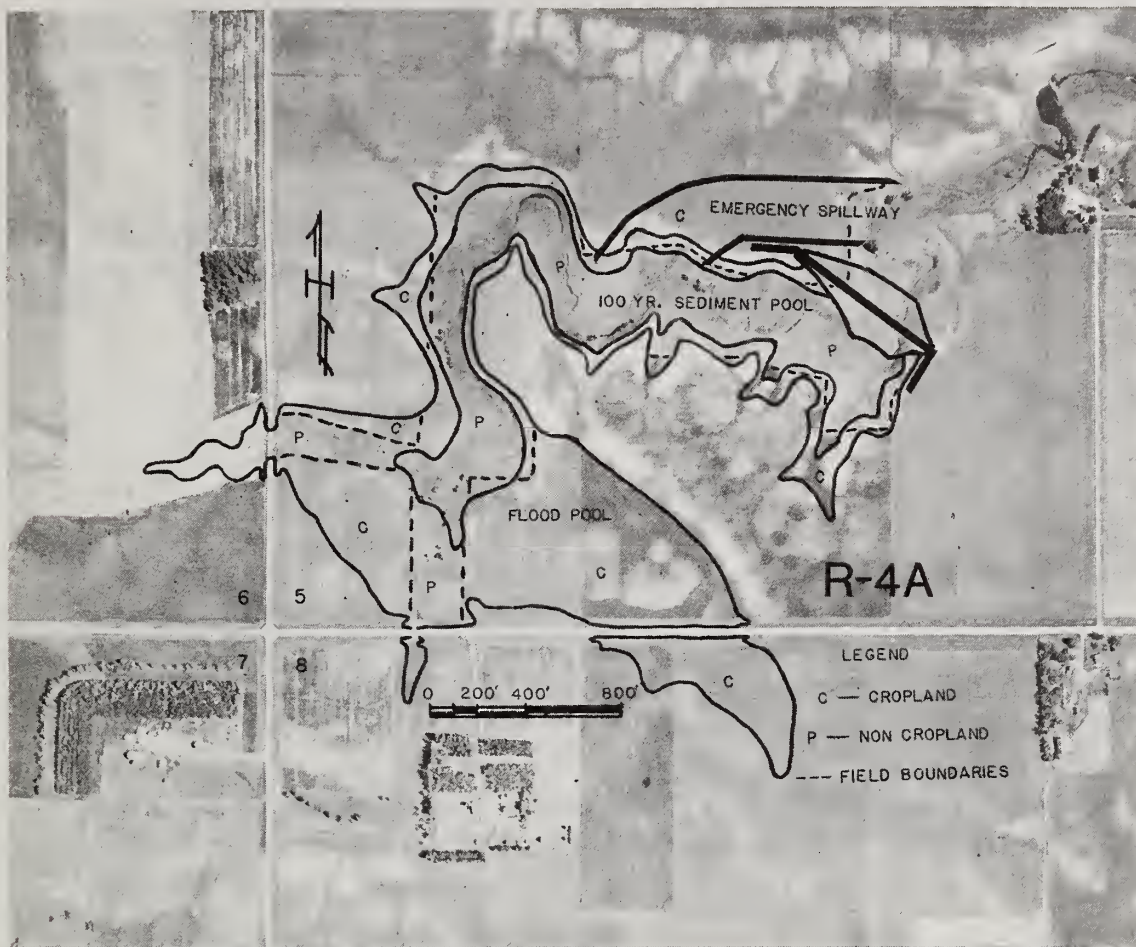












Substance or CharacteristicLimit or Range

Phenols

0.01 milligram per liter and none that could impart odor or taste to fish flesh or other fresh-water edible products such as crayfish, clams, prawns and like creatures. Where it seems probable that a discharge may result in tainting of edible aquatic products, bio-assays and taste panels will be required to determine whether tainting is likely or present.

Turbidity value

10

Color value

30

Fecal coliform organisms

200 most probable number per 100 milliliters as a monthly geometric mean based on not less than 5 samples per month, nor exceed 400 most probable number per 100 milliliters in more than 10% of all samples during any month.

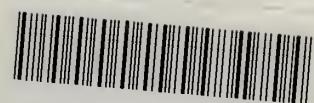
Radioactive materials

Not to exceed the lowest concentrations permitted to be discharged to an uncontrolled environment as prescribed by the appropriate authority having control over their use.









R0000 884658



R0000 884658